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JANUARY 1994

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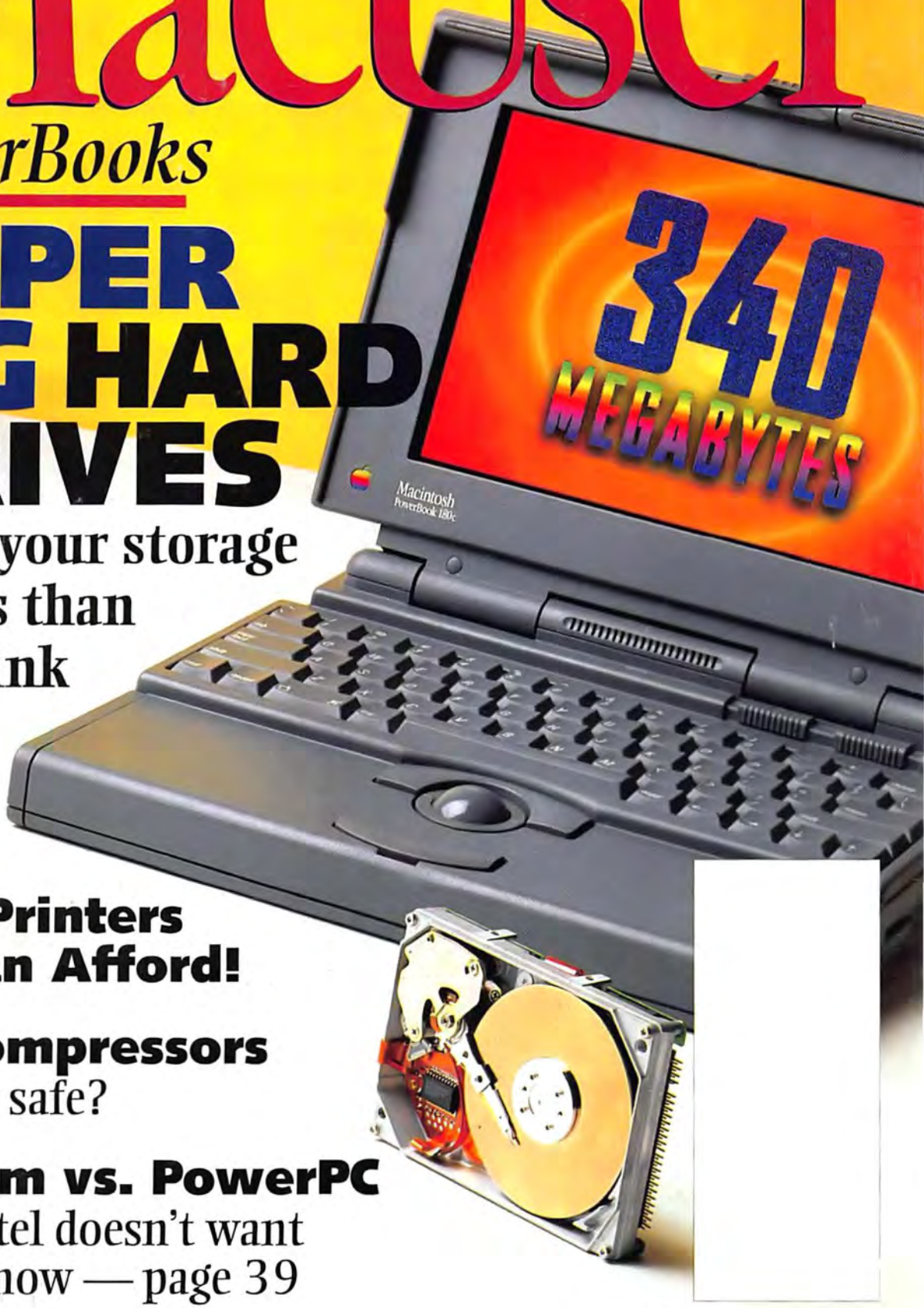

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Are they safe?

Pentium vs. PowerPC
What Intel doesn't want you to know — page 39

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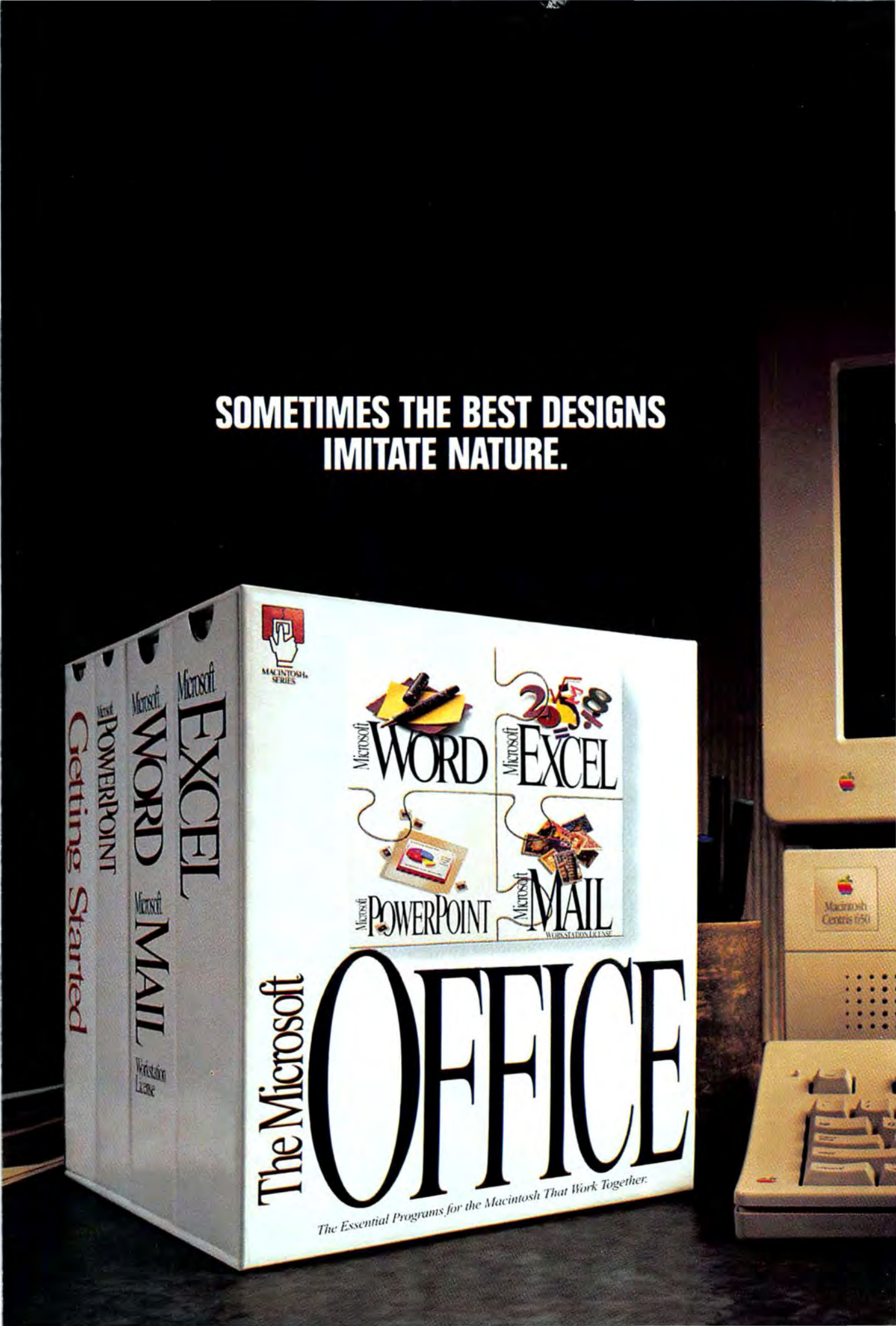
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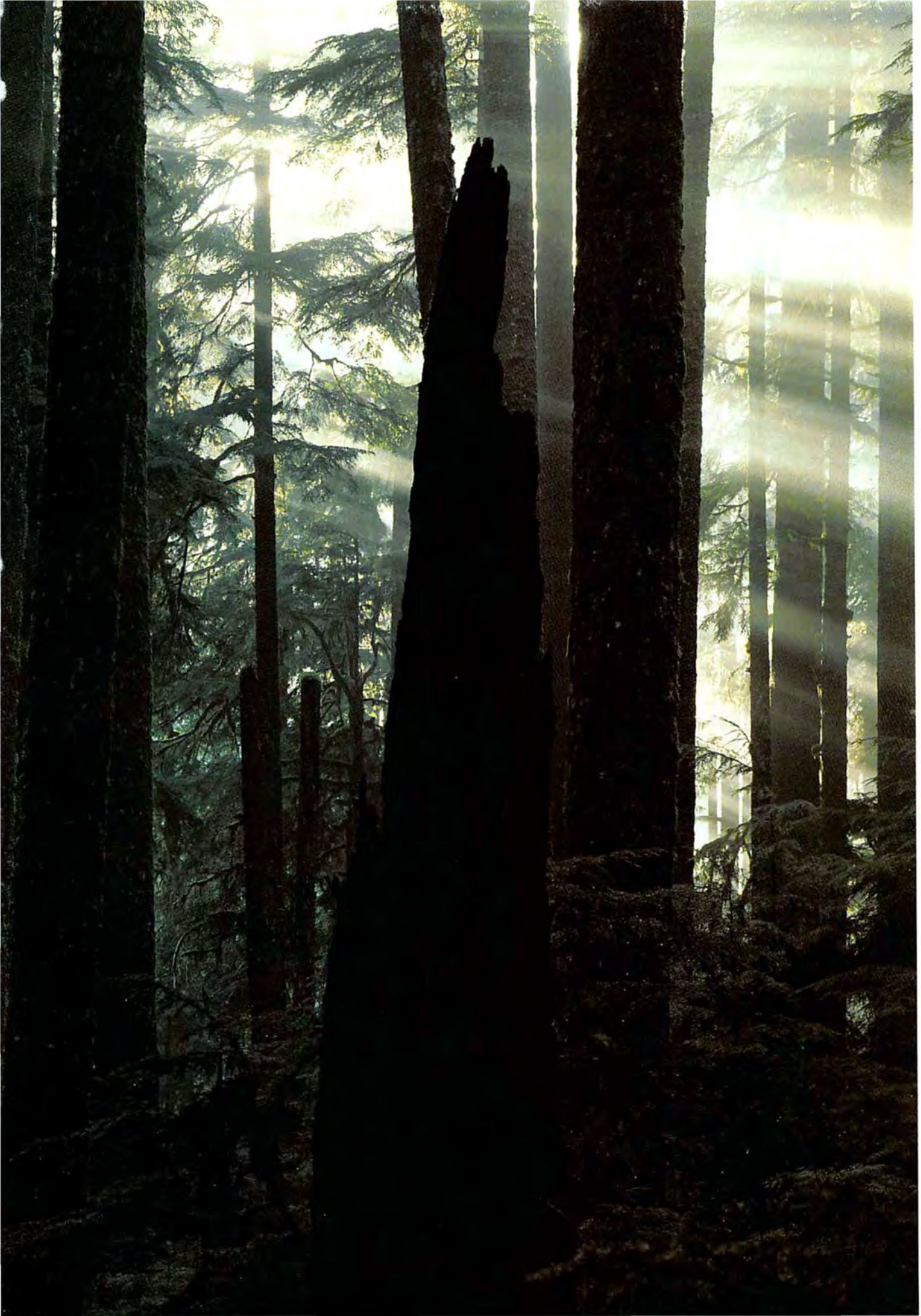

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On the cover: High-capacity hard drives can turn your PowerBook into a data-storage powerhouse. **Cover photo** by Fred Stimson

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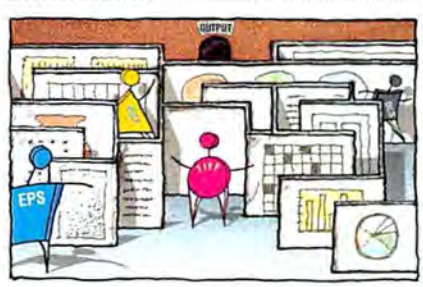

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About

MacUser

The Macintosh Decade

Where were you in January 1984? For some people, that month will be forever etched in their brains. It was then, ten years ago this month, that the Macintosh was born. And yes, it was a historic event.

"I don't know how many times I'd read about the people involved in the early days of Mac and how they believed they were about to change the world," recalls Cheryl England, one of the writers of this month's anniversary special (see "Celebrating 10 Years of Macintosh," page 81). "I'd always dismiss it, thinking it was PR fluff.

"But when I talked to these people, I suddenly understood that that *is* what they believed. They had built this funny-looking black-and-white machine that was not compatible with a single thing — while the market-defining PC had color, slots, memory, and applications. And they truly believed they were doing the world a favor."

Senior editor Cheryl England celebrates the tenth anniversary of the Macintosh in words and pictures.

And they were. The Mac introduced the graphical user interface, with its windows, icons, menus, and mouse. It brought computing power to people who would never otherwise have used a computer. This quiet revolution couldn't have succeeded without the third-party developers who took a chance, not only on a new platform but also on a new model of computing. "These people are very proud of what they have done," Cheryl reports. "And they should be."

Many of these pioneering third-party-software and -hardware developers contributed to this issue's look at ten years of Mac history. Cheryl never intended to write the official Mac story, but when she talked to Apple, she quickly realized that she was even more on her own than she had expected.

"Apple's very focused on its new direction right now." Wishing Apple well, Cheryl rounded up the phone numbers of the software and hardware developers of those early years and called on them to share their memories and their memorabilia.

It took "a lot of phone calls. It's pretty darn hard to find ten-year-old images. People don't necessarily save that stuff, and if they do, it's because the items mean something to them, so they are worried about the harm that might occur."

But they came through with dates and data — and with their impressions and perspectives. "I tried to capture not only key events but also the feeling of each year," Cheryl says. She is particularly indebted to these Mac pioneers for their contributions to this story: Mike Boich, Bill Campbell, Bud Colligan, Mike Dhuey, Donna Dubinsky, Charles Geschke, Jeff Harbers, Charlie Jackson, Reese Jones, Susan Kare, Doug Macrae, Dennis Marshall, Mike Murray, Evan Solley, and Del Yocam.

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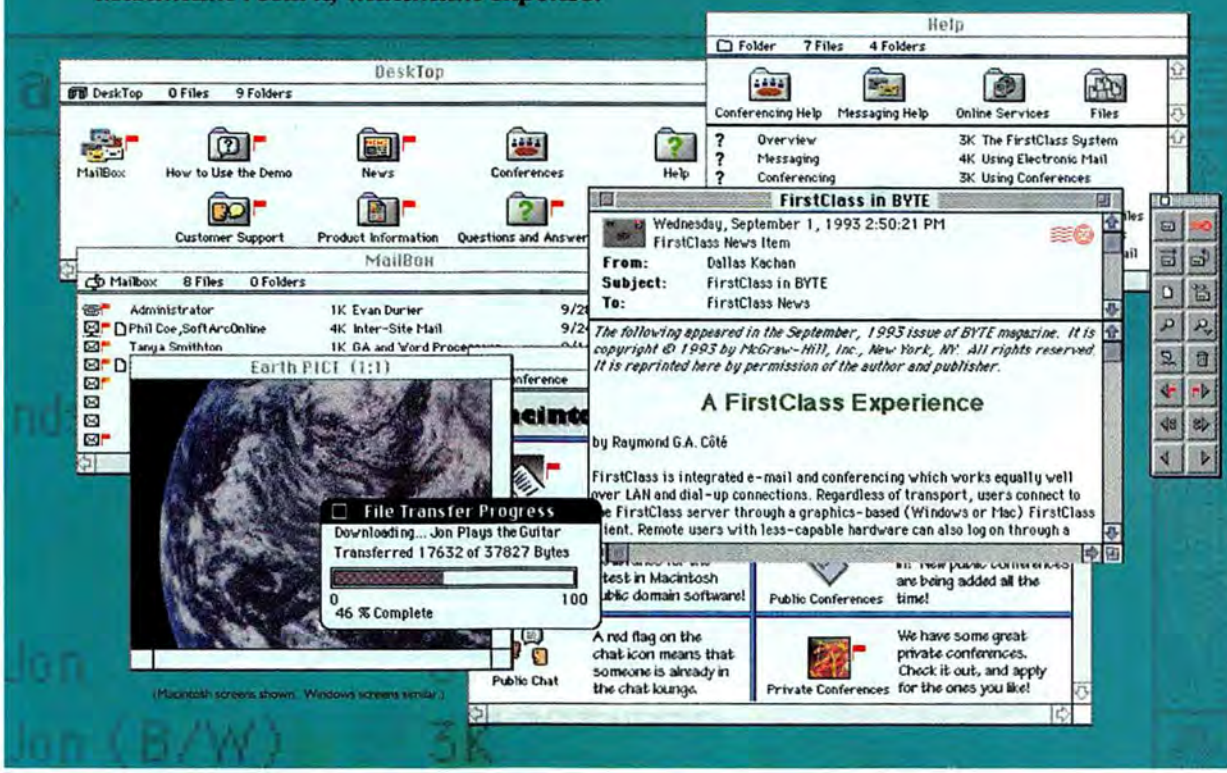

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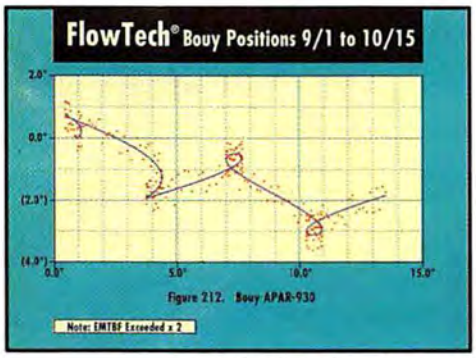

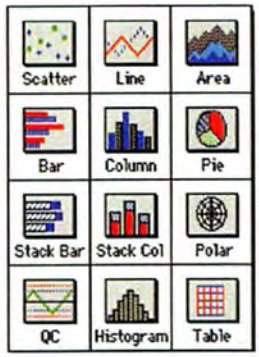

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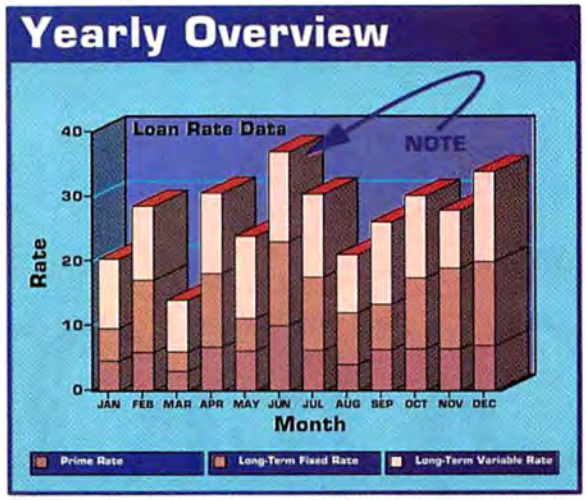

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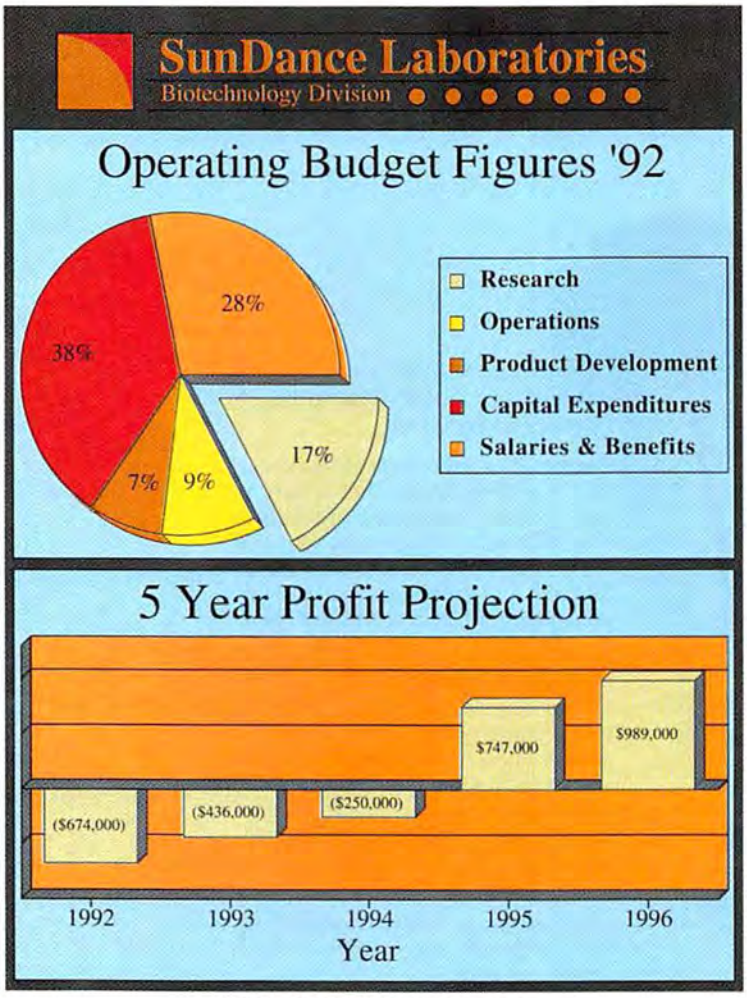
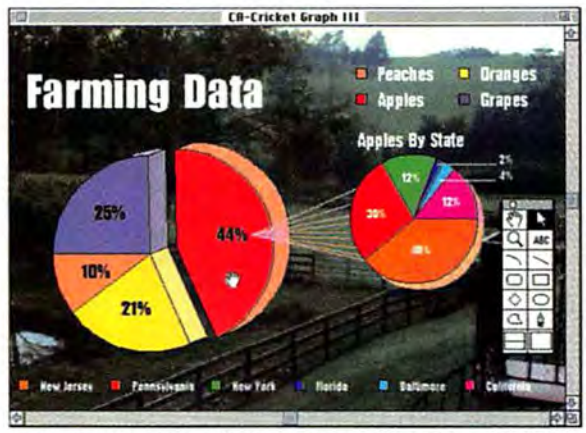


You can create multiple graphs on a page.



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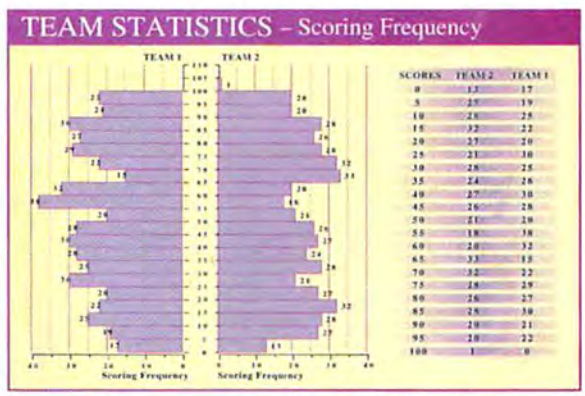

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CIRCLE 164 ON READER SERVICE CARD.

Dan Skarka, of Larkspur, California, thinks we've been working too hard. "Regarding your cover photo of the Newton MessagePad (October '93): It lists 'Places to consider for retreat: Honolulu, Anchorage, San Jose' . . . San Jose?" Don't worry, Dan. By the time the Newton's handwriting recognition kicked in, we were on our way to Saint-Tropez.

Write to Letters to the Editor, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the

MacUser Forum of ZiffNet/Mac, our on-line service. All letters become the property of *MacUser*, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

The Power to Be Redressed

The time has come to shake a proverbial finger. Your recent articles on Apple's award-winning, billion-dollar PowerBook business ("I Don't Want a Duo," August '93, page 189, and "The PowerBook from Hell," September '93, page 27) did justice neither to our products nor to *MacUser* readers.

The PowerBook has been hailed by designers, editors, readers, and notebook-computer users as one of Apple's most innovative and successful products ever. The Duo line followed in the footsteps of earlier PowerBooks and received an impressive array of awards. But like every company that sells hundreds of thousands of a single product each year, Apple occasionally has a customer who gets a lemon. Although this may happen infrequently, we do take note and take action. As the Apple vice president responsible for these products, I am personally concerned when any customer is less than satisfied with Apple's products or services.

Apple has an extensive customer-assistance program. We have resources in place to deal with those few recalcitrant PowerBooks. The company goes the extra mile by picking up an offending machine at the customer's door and returning it repaired in less than 72 hours in the vast majority of cases. (Just call our Customer Assistance Center at 800-767-2775.)

We know our users don't like being separated from their notebook computers. It's part of our business to minimize the inconvenience.

Randy Battat
Vice President
Macintosh Desktop & PowerBook Division
Apple Computer, Inc.
Cupertino, CA

I don't usually write letters like this, but I just finished reading Andy Ihnatko's article "The PowerBook from Hell." As a new owner of a PowerBook 160, I'm happy to know that there are people such as Andy who can and will aid someone such as Ilene. It just occurred to me why I don't usually write letters like this: I decide to write while I'm reading the magazine, but the urge is sufficiently dissipated by the time I get to where my computer's set up. When I have the PowerBook with me, I simply open it up and start writing.

Steven W. Pollard
Kaneohe, HI

Thus proving Mr. Battat's point. — PP

Sticky Fingers

Thank you, thank you, thank you! Just as my LC's keyboard was beginning to die a slow death, Tom Petaccia's Mac Workshop article (October '93, page 155) gave me the wherewithal to do a long-overdue cleanup. The keyboard had not been opened since early 1990, and you can imagine what fell out when I opened the case. I never realized how much hair and dust can fall between the keys. Tom's directions were for cleaning the Extended Keyboard, but they were clear enough for me to use with my Apple Keyboard II. Thanks

Open Folder

Following last month's reader rant about companies that charge too much for upgrades, this month, readers take aim at companies that make technical support difficult and expensive. Mack Greathouse, of Valyermo, California, chides Adobe Systems, Hewlett-Packard, and Microtek Lab for using telephone-answering systems for technical-support calls. Ideally, Mack wants to call toll-free and talk to a human being immediately. "I could accept telephoning at my expense if I were not faced with idiotic, convoluted, time-consuming recordings." Applying *MacUser* mouse ratings, Mack gives these companies half a mouse — the lower half.

"Software companies that charge for technical support make my blood boil," writes Stephen Blagden, of Arlington, Massachusetts. "If the documentation were clear and comprehensive, most tech calls would be unnecessary." But finding a silver lining, Stephen singles out Ready,Set,Go! developer Manhattan Graphics for tech support the way it ought to be, with toll-free tech support *and* free software upgrades. Hear that, Aldus and Quark?

Now that Microsoft has announced plans to charge as much as $2 a minute for off-hours calls, Fred Jedder, of Dublin, California, is steamed that after paying an arm and a leg for software, he has to fork out more when it doesn't work. "If companies want to make money on phone calls, maybe they should start their own phone-sex network. A sultry, sexy voice welcomes you on the phone: 'For hard-drive problems, press 1. For problems with sticktion, press 2. To order a male or female connector, press 3.'" Easy now, Fred.

Finally, David Carroll, of Brighton, Massachusetts, suggests that *MacUser* start a monthly readers' forum for harangues that are too long for the regular letters column but still applicable to this wacky Mac world. Great idea, David. We could call it Open Folder!

Got a gripe? Need to get a grip? Write to Open Folder, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. The usual caveats about letters apply.

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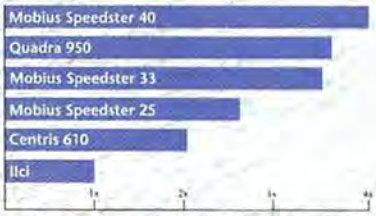

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LETTERS

for helping this Mac last a little longer before needing a trip to the repair shop.

Jerry Plotkin
via ZiffNet/Mac

What's the Connectix?

Over the past five years, *MacUser* has provided positive and intelligent editorial coverage of Connectix products. In surprising contrast, your October issue contained a review ("PBTools, Power To Go, and CPU 2.0," page 48) that was inaccurate and misleading.

First, the article claims that CPU 2.0 lets the PowerBook go to sleep during a communications session, calling it a "fatal flaw." CPU never lets the PowerBook sleep when downloading a file. Because CPU is designed for maximum battery-life extension, the utility will put the PowerBook to sleep after a user-determined period, but only if there is absolutely no activity during the period. The user always has the option to set the sleep time to Never if this is a concern.

No. 1 on Maggie Canon's list (clone the Mac) should be No. 1 on Spindler's. Cloning is why PCs dominate the market.

Second, the review implied that power controls require manual setup. In fact, CPU provides easy preconfigured sets for the most common environments — home, office, and on the road.

Third, our file-synchronization extension, EasySync, has always had the ability to distinguish when a file and its copy have both been changed. As the manual clearly states, "EasySync recognizes when you make changes to both copies of a file. When this occurs, an alert box appears."

We respect your reviewer's right to her opinion about the pros and cons of the three products, but we must suggest that these opinions are out of line with those of the market, the industry, and even the previous review by your own publication.

Roy K. McDonald
President
Connectix
San Mateo, CA

True, CPU won't put the PowerBook to sleep during a download. However, communications sessions are more than just downloads, and CPU will put the PowerBook to sleep if there's a period of inactivity. This is not the same as AppleLink's automatic disconnect, because CPU's abrupt session termination is not controlled by the communications software or service. But it's true that the user can work around the problem by setting a long sleep interval for telecommunications sessions.

The original version of the review pointed out that users had control over the sets; it was edited to say that the setup was "required." CPU's use of sets has always been a strong point and one that I favor.

The manual does state that EasySync knows if files have been changed in both locations. But the dialog box that appears in this situation (as noted in the manual) is identical to the one that appears when one file is simply older than the other one. How are users supposed to tell the difference? — SZA

Two's Company

Maggie Canon's perspectives would be better relegated to the back page, right next to John C. Dvorak. First, she declares that Apple must port the Mac OS to Intel machines ("Getting Back on Track," September '93, page 21). Virtually every Macintosh user I know would feel saddened and betrayed by such an event. Now, she states, "Overall, PowerPC products will give Mac users as much functionality as any DOS/Windows machine or more" ("PowerPC Prophecies," October '93, page 23). Say what? I thought my Macintosh was pretty functional already! I'm surprised that there isn't a poster of Bill Gates in the office Maggie's photographed in.

Mic Chaudoir
Northlake, IL

Ditto for Maggie Canon's top ten action items for getting Apple back on track. I'm forced to use a 486 with Windows at work, but when I paid with my money, it was for a Mac. Ten years from now, I want Apple around doing it right, as it did with my PowerBook. No. 1 on Maggie's list (clone the Mac) should be No. 1 on Spindler's. Cloning is the main reason PCs dominate the market. Get rid of the paranoia, Apple.

John StJohn
Tualatin, OR

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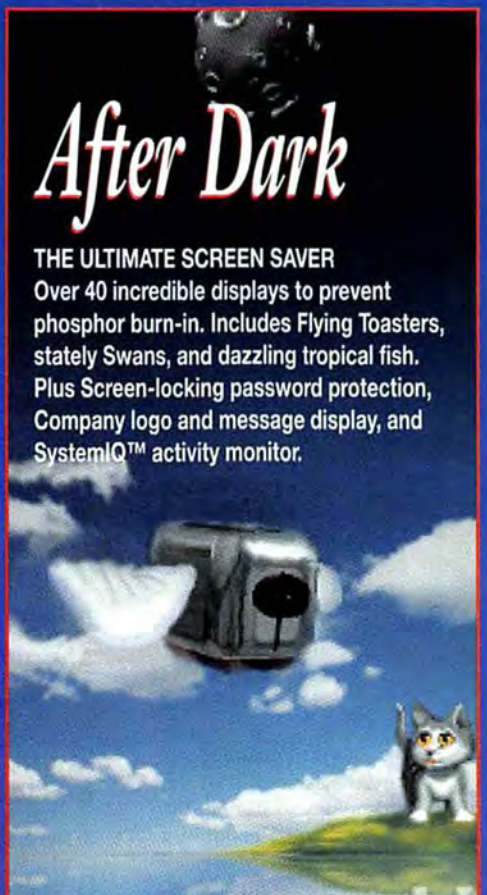

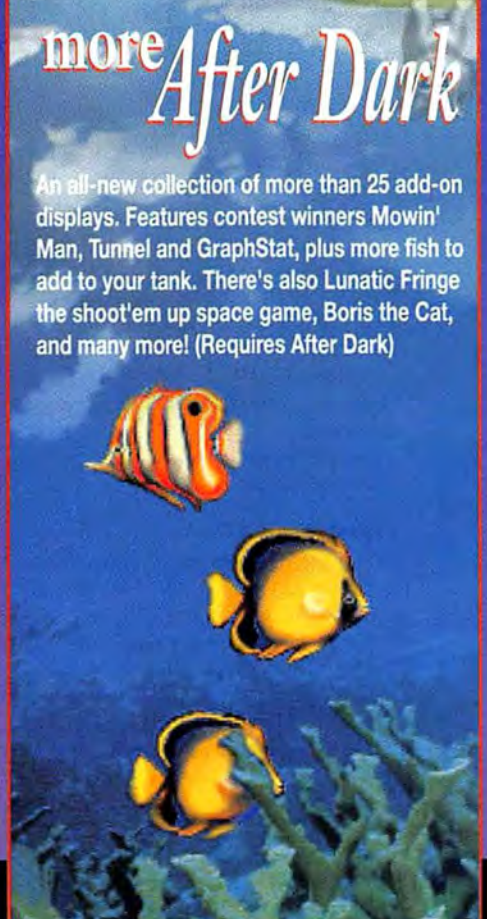

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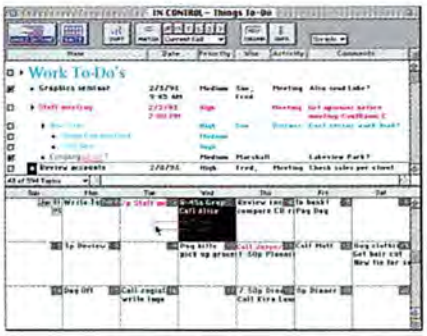

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LETTERS

This Must Be Heaven

Hell is a three-letter word that's spelled D-O-S, and its synonym must be I-B-M. During a recent visit with my father-in-law, he asked me to help him retrieve a lost file on his PC. The confusion of equipment before me was as great as my father-in-law's bewilderment at not being able to retrieve his file. He was using a Toshiba laptop PC running WordPerfect 5.1, plus a Commodore monitor and a Tandy printer. These are all good products in themselves, but the plethora of brand names brought home the danger of licensing the operating system and other aspects of the technology to makers of clones. As soon as the innovative manufacturer loses control of the technology, control of the quality and compatibility is also lost.

To ensure high standards and a consistent product from an innovative manufacturer, Apple should resist efforts to license its technology to third parties.

Graham Fawcett
Greely, ON
Canada

Michael Swaine should get a copy of NeXTstep so he can learn for himself that there is a lot under the hood.

Recently, we purchased a new hard drive for our 486 at work. As I installed MS-DOS 5.0 on it, I saw this filename flicker by:

DOSSHELL.EXE

Silly me. I thought *DOS* was spelled with one *S*.

Andreas V. Kadavanich
El Cerrito, CA

What's NeXT?

Can Michael Swaine explain how NeXTstep and Amber have any overlap at all? In his September '93 column ("What Apple's Doing Right"), he implies that Amber represents some threat to NeXTstep. I think he should get a copy of NeXTstep to use for a couple of months so he can learn for himself that there is a lot under the hood. True, Amber is a better compound-document structure than NeXTstep currently is, but by the time Amber is out and supported by developers, you may see NeXT ship something better.

Bruce Henderson
via ZiffNet/Mac

Granted, NeXTstep is probably the best software-development environment on the face of the earth, and Amber is no threat to it technically. But any technology from Apple that purports to remove even one of the perceived advantages of NeXTstep is a threat to NeXTstep sales. NeXT deserves to prosper, and I hope it does. — MS

ProVue Review

Your review of Power Team (October '93, page 53) failed to mention some of the key features that distinguish Power Team from its competitors.

Power Team offers seamless integration among its Phone Book, Calendar, Correspondence, and Checkbook modules. A single click jumps you from an appointment you've scheduled with someone in the Calendar to that person's corresponding entry in the Phone Book; another click displays the most-recent correspondence for that person. No other organizer software for the Mac can match this tight integration.

Another important area is Power Team's unique "natural fields" for data entry, especially in the Phone Book module. Users simply enter the name, address, phone number, and so on in a natural format. Power Team parses the data, separates it into individual fields (first name and last name, for example), and appropriately capitalizes it. It can even intelligently assign values to missing fields.

The review also failed to mention that, unlike ordinary word processors, Power Team keeps all of a user's correspondence neatly organized in a database file, where the user can find and search the correspondence immediately. Power Team also offers key benefits for PowerBook users.

The review incorrectly states that Power Team lacks mail-merge capability. The program can print personalized letters and envelopes to any group of people in the Phone Book or Mailing List modules. Contrary to the review, Power Team's Checkbook module does have an automatic check-numbering scheme that works exactly like Quicken's. I'm also puzzled by the reference

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	Copy to Multiple Destinations	■	
Backup	File/Folder Backup	■	
	Auto-backup over ARAP	■	
Startup Management	Specify Loadable Extensions	■	■
	Show Extensions Memory Needs	■	■
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Digital Notes	Note Pad/Tear-off Notes	■	
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	Change Menu Fonts	■	■
	Submenus in Apple Menu	■	■
Sound/Alert Management	Change Beep Sound	■	
	Assigns Sounds to any Event	■	
Document Saving	Auto-Save Documents		■
Printer Selection	Easy Printer Select	■	
	Configure Printer Menu	■	
Dialog Management	Open/Save Dialog Replacement	■	■
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	Delete Files	■	
	Change Sort Order	■	
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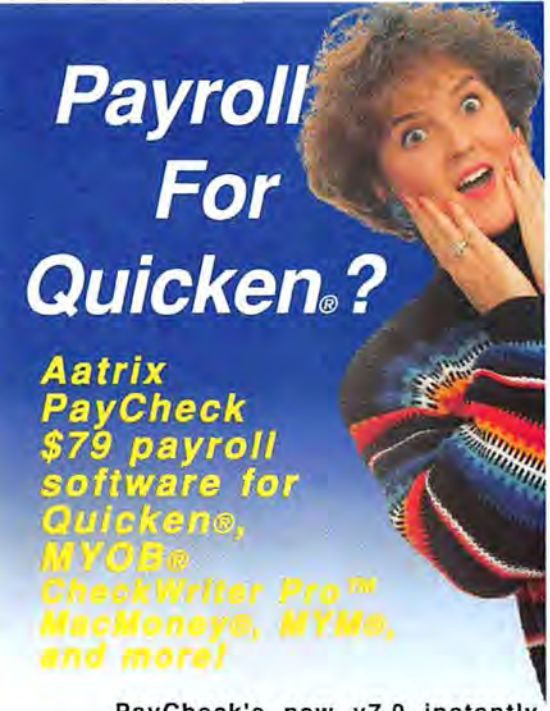

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CIRCLE 48 ON READER SERVICE CARD.

LETTERS

to "HyperCard-like windows" and "nonresizable windows," especially because ACT!, a program filled with nonresizable and nonmovable windows and dialog boxes, is favorably mentioned twice in the review.

True, Power Team does not do everything that every personal-organizer package on the market does, but we think the program has the right combination of seamlessly integrated features to get most people organized.

Jim Rea
President
ProVue Development
Huntington Beach, CA

The review did not say that Power Team lacks mail-merge capability but rather that it "lacks most mail-merge features found in contact-management programs." Specifically, you can't include merge fields in the body of the letter nor can you mix fonts or styles — two major shortcomings, in my opinion. The review's mention of ACT! was not in the context of interfaces. I'll plead mea culpa on the check numbering, but frankly, this is a minor detail that had no bearing on the overall rating. — TP

But Is It Art?

As an artist, graphic designer, and long-term Mac user, I was appalled by your article "Family Pictures" (September '93, page 226). I accept that there is a point at which state-of-the-art technology becomes a bona fide art form. I have seen numerous exhibits of art created by computers. In most instances, it is art that explores the unique properties of the medium, not output that attempts to mimic other art forms.

To even loosely label Dickson's output a painting is doing a great disservice to the art and computer worlds. Transforming a beloved family portrait into cousins of the Addams family and then labeling it "art" is more than I can take. I would imagine that the fascination with Dickson's results was not a matter of artistic merit but rather understandable awe at the complex gyrations she went through to create the image. Unfortunately, it still remains a poor image.

Lee Doliber
Miami Lakes, FL

I Hate Dvorak Because . . . .

For untold years, John C. Dvorak's column provoked my growls, jeers, and protests. "What a heap of junk," or "If he hates Macs and Apple so much, what's he doing in *my* magazine?"

But one year in April, he wrote of being fired for his unpopular views. Outrage! His closing words gave away the joke, and it was like finding out your first-born child was going to survive major surgery after all. I've read that rascal with greater appreciation since then. He's OK. Obviously, plenty of others haven't had the same breakthrough; hence the steady flow of anti-Dvorak mail on your Letters pages. Isn't it time you ran a regular column under some such headline as "I Hate Dvorak Because . . . ."?

Frank Heaton
Everett, WA

Corrections

The correct version number of Freedom of Press Classic (October '93, page 58) is 4.0.

The correct toll-free phone number for WordPerfect (New on the Menu, October '93, page 38) is 800-451-5151. The business number is 801-225-8000.

The correct price of the Radius PrecisionColor Pivot (October '93, page 51) is $1,449.

"The Multi-OS Mac" (October '93, page 133) stated that Quorum "reverse-engineered only a few pieces of the Mac's ROM code" for its product Equal. It should have said that Quorum wrote an API translator that routes Mac application-system calls to UNIX utilities.

The correct list price for the Nanao Flexscan 6500 mentioned in "Silver Screens" (July '93, page 130) is $1,899; the correct street price is $1,375.

The engine in the NEC Silentwriter Model 1097 (November '93, page 41) is actually based on NEC's Model 97 engine, and the printer comes with 7 megabytes of RAM.

The correct price of the Focus EtherLAN SC-T Ethernet box mentioned in "Ethernet for PowerBooks" (November '93, page 165) is $219.

Three companies that sell removable-media drives should have been included in the directory for "Choosing the Right Removable" (November '93, page 106): DGR sells 3.5- and 5.25-inch optical drives (800-235-9748 or 512-476-9855); MacProducts (800-622-3475 or 512-476-5295) and Third Wave (800-624-9307 or 512-477-9845) sell 3.5- and 5.25-inch optical drives and all models of SyQuest drives.

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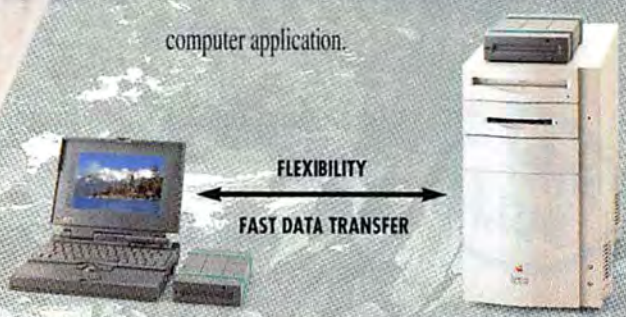

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CIRCLE 140 ON READER SERVICE CARD.

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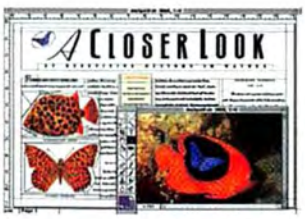

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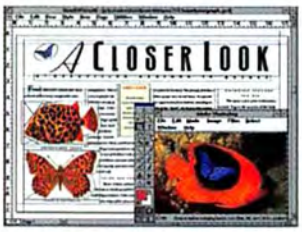

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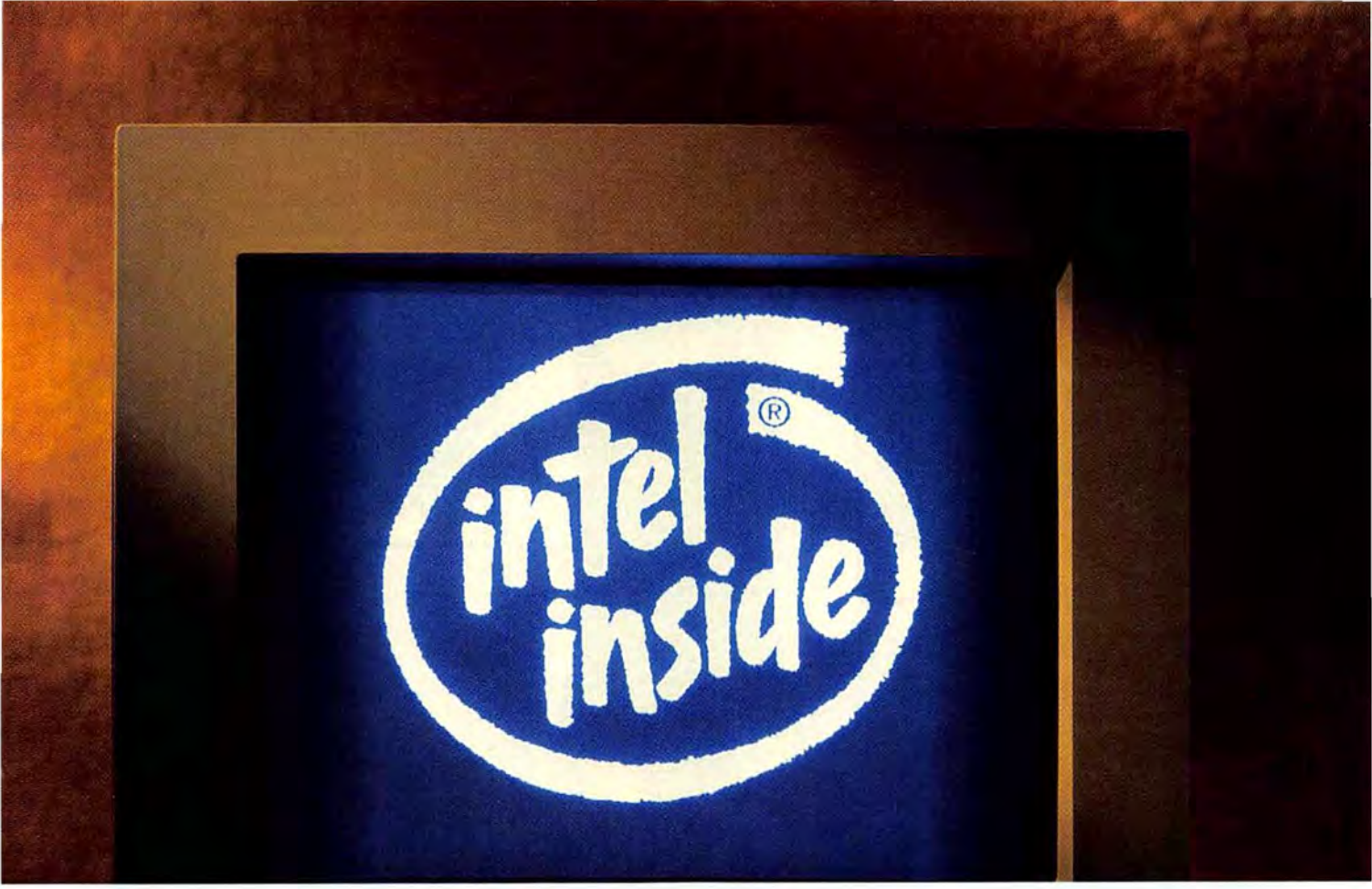

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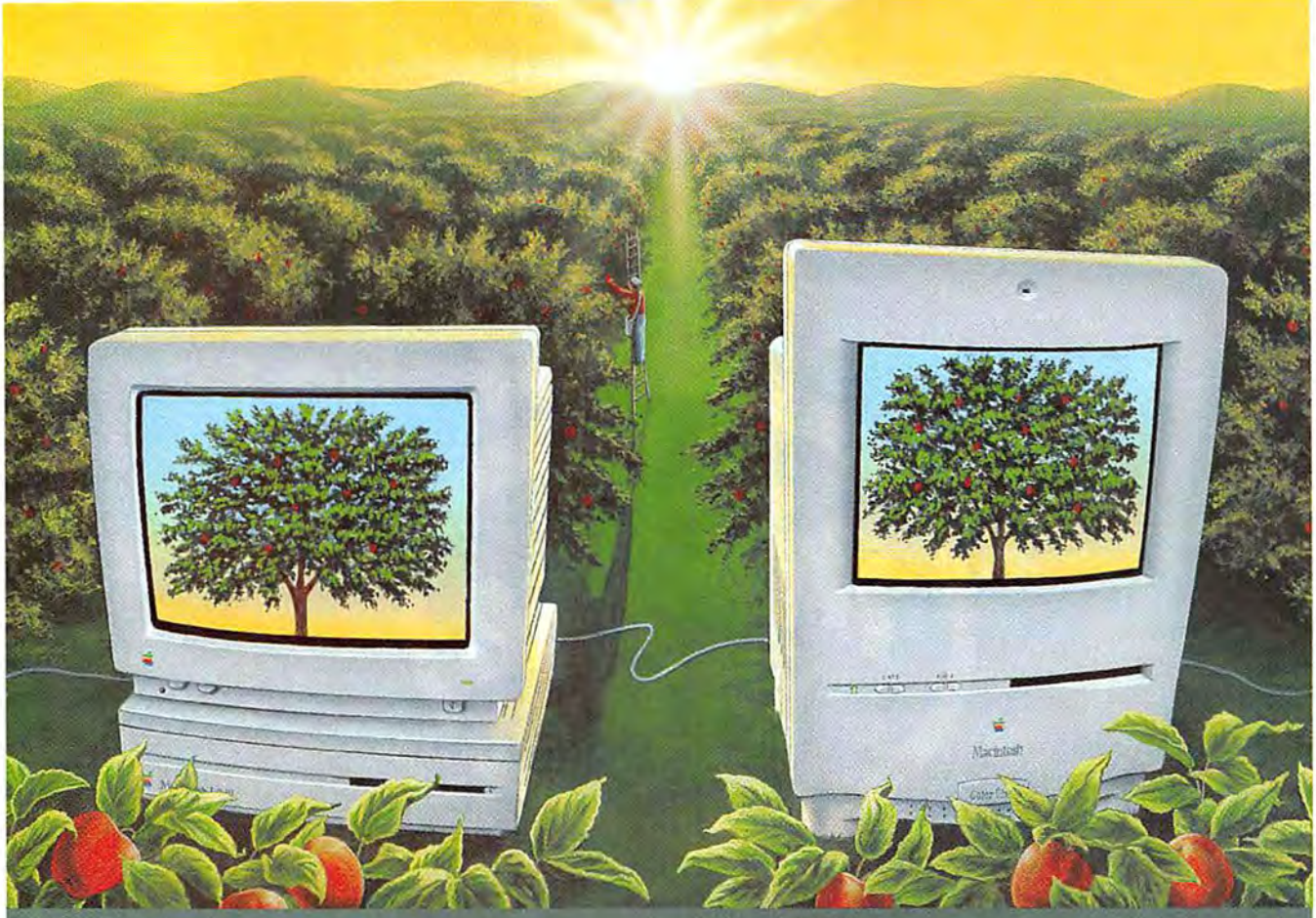

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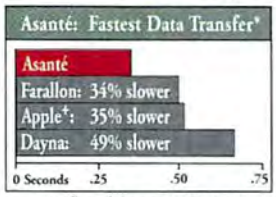

*32K file transfer between a Quadra 950 and Quadra 700. Source: Recommended Test Labs, Inc. 1993. Call Asanté for complete report.

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CIRCLE 86 ON READER SERVICE CARD.

The Future of System 7

If Apple lives up to its promises, within the next year or two, you'll be videoconferencing (from your desktop) with coworkers 3,000 miles away, using voice commands to tell your computer what to do and relying on desktop agents (descendants of the Newton Assistant) to search vast databases and assist you in organizing your life.

This scenario is all part of Apple's far-flung and loosely organized operating-systems strategy. System 7 users got a glimpse of the future with the introduction of System 7 Pro, which comprises PowerTalk, AppleScript, and QuickTime 1.6 — along with a few tweaks to the Finder. Contrary to the impression its belated arrival might make (it's two years late), PowerTalk has the potential to make a lot of lives a lot more efficient. As someone who relies on five different e-mail services, I'd say that just being able to get all of my e-mail in one place may make PowerTalk worth waiting for.

AppleScript will probably be the next-most-important part of System 7 Pro, enabling users to customize and automate desktop tasks. For years, analysts have reminded us that computers haven't actually improved white-collar productivity. I believe application scripting will allow computing to increase productivity more than any other technological advance in recent memory.

System 7 Pro represents the beginning of Apple's multiproduct approach to system software, according to David Nagel, head of Apple's software division, AppleSoft. Standard System 7 is now earmarked for entry-level and/or individual (non-networked) users. The Pro series is aimed at workgroups that need special tools for collaborative computing. Rounding out the spectrum is PowerOpen, for enterprise customers.

System 7 Pro also marks Apple's continuing effort to turn its operating system into a revenue generator. Although for now System 7 and its successors come preinstalled, users can expect to pay extra for "bleeding edge" functionality such as that of PowerTalk and AppleScript. Of course, as those technologies become widespread, expect Apple to incorporate them into the standard System 7 releases (as happened with QuickTime). With Apple's hardware margins down in the 20-percent range, it's not surprising that the company is looking for other revenue streams. That means the days of free upgrades are gone forever (although Nagel assures me that bug fixes and assorted other system tweaks will continue to be free).

Apple invented what's become the standard interface for personal computers, and it ain't finished yet.

What will users get for their money? As Apple shifts to the PowerPC, the user interface will begin a fundamental transformation. Apple's overall goal is to make the interface more natural, and the raw horsepower the PowerPC supplies will help drive a lot of this innovation. Processor-intensive technologies such as 3-D imaging and voice recognition will become standard.

Besides modernizing the user interface, Apple's other main strategic direction is to become more open. Apple announced OpenDoc, an open, cross-platform compound-document architecture, at last May's Worldwide Developers Conference. (A compound document is one that can integrate text, graphics, sound, and video.) More recently, the formation of the OpenDoc Consortium united such industry giants as IBM, Novell, Borland, and WordPerfect to research and develop OpenDoc-compatible products. The OpenDoc architecture, which will be available on Windows platforms in addition to the Mac, should arrive by mid-1994. Apple is also working on a microkernel that will make its system software portable to other environments. Nagel tells me you can expect to see a version of Apple's system software on other PowerPC platforms besides Apple's. No names or dates yet.

Of all the strategies Apple is pursuing, OpenDoc is probably the most interesting. It represents a fundamental rethinking of how we use personal computers — with the emphasis on the work (documents) rather than the tools (applications). Being able to drag and drop data of any kind into a document and then edit it within the context of the document — without having to cut and paste among various application windows — is incredibly appealing. Why should I have to learn the charting functions of my spreadsheet and presentation programs if I can use my favorite charting program's functions throughout a compound document?

Ten years ago, if you'd predicted that most personal computers would incorporate menus, mice, and windows, no one — with the exception of the original Mac team — would have taken you seriously. But, today, thanks to Apple's pioneering efforts to make computers easy to use, graphical user interfaces are standard fare on most personal computers. And I'd be willing to wager that Apple's contributions to innovative user-interface design are far from over.

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CIRCLE 68 ON READER SERVICE CARD.

ANDY IHNATKO

Volume, Volume, Volume

Everyone should know certain things — like how to tell when new Macs are coming and how to win bar bets.

Normally, each of my columns is lovingly handcrafted, using classic Old World techniques, one at a time, in a painstakingly meticulous process that dates all the way back to the founding of the Columnists' Guild in 1420. One column, one topic, every 30 days, ever since the column's inception. But if the Volume concept is effective enough to get VCRs and PEZ dispensers into every American household, then who am I to assume it has no place in an editorial effort such as this?

Therefore, in a nod to modern production methods, I am writing no fewer than six columns on six different topics for you this month, at absolutely no increase in cover price. All the topics (well, almost all of them) originated from actual questions from actual readers, submitted in the past two months.

New Macs When?

Nothing can generate that vertigo-like sensation of Things Gone Horribly Wrong like splashing thousands of dollars on a new Mac and seeing something newer, cheaper, and faster hit the market the following month. It's a fact of life; you can't stay sane in this industry without resigning yourself to the idea that something better is *always* around the corner.

Nonetheless, the aforementioned tragedy is eminently avoidable. For starters, don't call up Apple's customer-assistance line. These jovial folks are capable of many nice things, but providing accurate information about upcoming (as opposed to current) products is not among them. I won't speculate why, but frankly, if you had phoned them in December of 1983 and asked if there was any reason not to buy that $10,000 Lisa system, they'd have told you they were maybe thinking about a 128K version of the Apple IIe but, other than that, no new models were on the drawing board.

Keep in mind that, in general, Apple releases new Macs around four dates: the annual stockholders' meeting, in late October; the Macworld Expos, in August and January; and occasionally the Worldwide Developers Conference, in May. So, if it's late September and you're headed for your local dealer with checkbook in hand and stars in your eyes, you'd do well to put up with your clanky SE for another month.

But the big thing to know is that a new Mac is usually about as big a surprise as the identities of Grammy winners. Leaks (intentional and otherwise) always ensure that when a new Mac is soon to be released, the only unknown details will be the name and the exact price. Unfortunately, your trendier, glossier magazines (this one included) usually can't talk about specific unreleased models; their staffers sign complicated nondisclosure agreements that ensure (a) they'll get to test new machines months before their release and (b) if they spill the beans, the editors have to spend a summer mowing the lawns on the Apple campus. So look elsewhere for information. *MacWEEK*, the popular newsweekly published by the same folks who put out this rag, doesn't sign nondisclosure agreements, so anything the reporters manage to dig up on their own is fair game; in fact, they're often referred to less than lovingly as *MacLEAK* by industry folk, due to their ability to get the lowdown. Your second great source is obvious: Turn to the rest of humanity, and ask around. Call your local user group, or better yet, get on-line. Posting a public message explaining what you intend to buy and then waiting a couple of days will save you a boatload of trouble.

Desperately Seeking Software

It's a basic problem in the field of consumerism: You have the money, and with surgical precision, you've defined your software needs, but your needs fall somewhere outside the parameters of the basic Word Processor, Spreadsheet, and Database phyla. No, what you need is a program for managing a combination candlepin-bowling alley/arcade/snack bar in Maine, and unfortunately, none of our major advertisers seem to stock such a beast. Where to go?

Well, I don't intend to make this into a running theme, but if you have a modem, you can ask thousands of people if they've ever seen what you're looking for. You can also call your local user group, but I bet that already occurred to you. OK, try looking in the *Macintosh Product Registry*. This commercial quarterly publication in one thick volume lists hundreds of products in dozens of categories, complete with synopses, pricing, and company addresses. Although it doesn't provide information on which I'd base an entire decision to buy, I don't know of any other reliable publication that comes closer to cataloguing all the software out there.

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Finally, rummage through the shareware libraries on-line or on dozens of cheap CD-ROMs. You'll find that many folks have been in precisely your situation and, when faced with a vacuum, filled it with bowling-alley-management software. Well, maybe not, but chances are you'll find a database file or spreadsheet template that suits your needs. As for the straightforward answer of hiring someone to write such a program or template for you — well, that's a topic suited for an entire column in itself.

They Might Be Industry Giants

Honestly, I can't tell you the dozens and dozens of times people have asked me, "When was the last time you got a haircut?" and I find it pretty annoying, so please cut it out. But the second most popular question is, oddly enough, "Boy, Steve Wozniak and Steve Jobs, famed founders of Apple Computer, are ten times as rich as I'll ever be if I live to be a hundred. Is there some embarrassing tidbit in their past that might help this bitter green hockey-puck-sized pill of jealousy go down a little more smoothly?"

Happy to oblige. Get this: During the lean years, Woz and Jobs actually made money dancing around in animal costumes at a kiddy funland. Admittedly, this is a trivial price to pay for a vast personal fortune and a firm spot in American folklore and business history, but we have to grasp at whatever we can get.

You Know My Mac — Look Up the Serial Number

I devoted a little space to this topic early last year, but people keep asking about it and it bears repeating. When a dealer, generally a mail-order one, tries to sell you a new Mac with all its serial numbers removed and without a registration card, it doesn't necessarily mean it's stolen property but it certainly does mean you should consider taking your money elsewhere. See, Apple does not allow its authorized dealers to sell Macs via mail order or to provide Macs to companies that do. However, it *is* possible to buy new Macs via mail order, so clearly these companies are getting their merchandise from somewhere.

You guessed it — they generally get it from authorized dealers who are not exactly eager for Apple to find out what they're up to and therefore strip each unit of anything that might be associated with their dealership. OK, so if you're getting a great deal, is this really so bad? Sure, because when the serial number goes, the Apple warranty goes with it, and unless the mail-order vendor is willing to provide a warranty of its own, you're up a certain creek without a certain implement. Many dealers are also squeamish about servicing such a Mac whether it's under warranty or not, so you ought to carefully consider whether the savings are worth the extra hassle.

YA GOTTA HAVE ALL THE TOOLS

Getting started with Mac graphics can be pretty complex. ✎ Drawing. Painting. Image editing. How can you be sure that you'll have all the tools you need in one handy place? ✎ You could fork over a bundle for three separate programs. ✎ Or better yet, you could just whip out your trusty Deneba artWORKS™, the handy new integrated graphics package that combines the very best of everything. For a price that's next to nothing. ✎ Click open artWORKS and in one simple-to-use software bundle you'll find complete and

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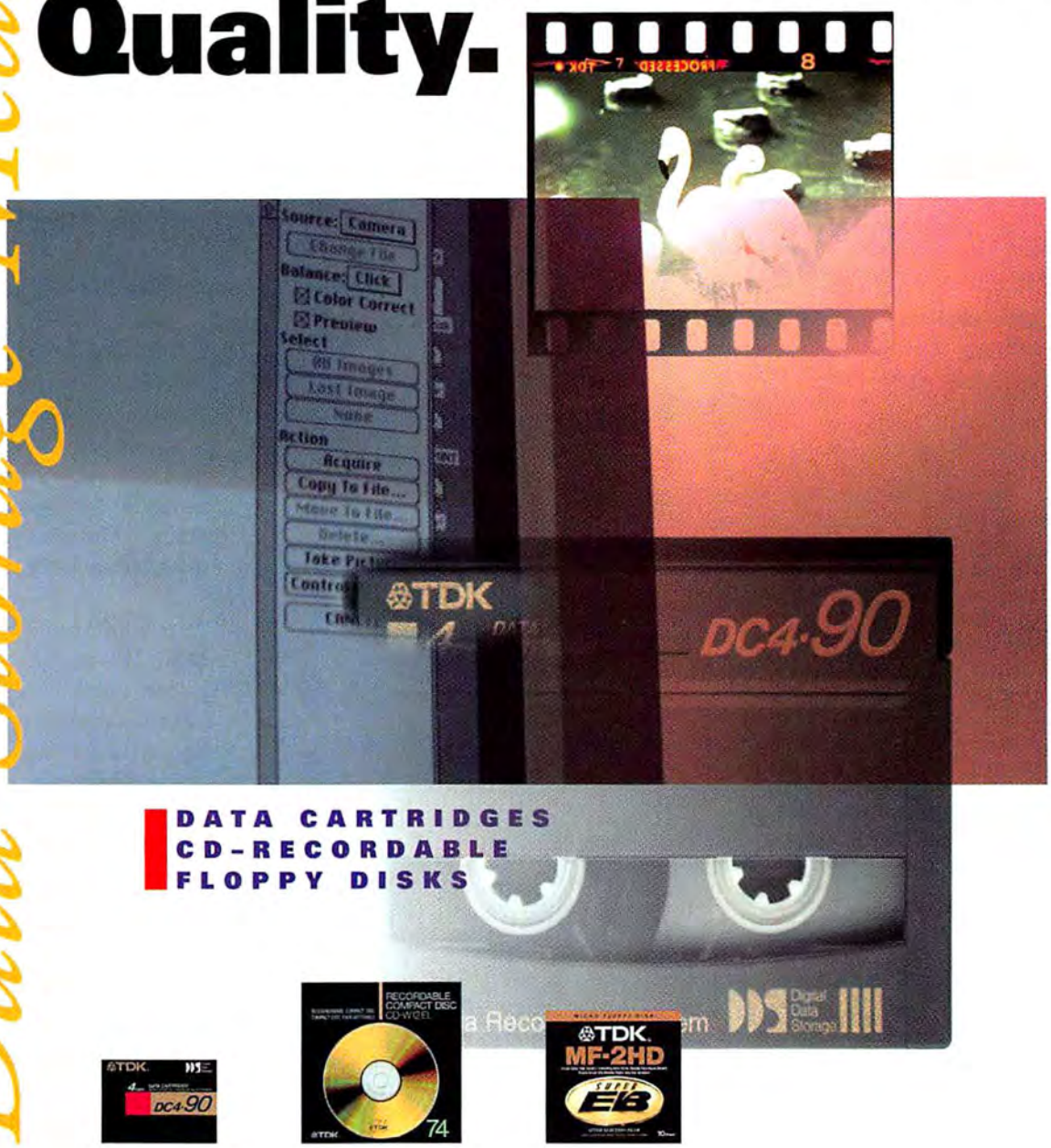

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TDK

Analog-Waveform Syncing

This, my friends, is one of the most useful pieces of information I've ever come across: The theme from "Gilligan's Island" was based on an old sea song, which was in turn based on the multicentury supersmash hit "Amazing Grace," which means that instead of setting up the complicated history of an ongoing investigation of sociological mores in the mid-20th century, the tune can be used to spread a universal message of spiritual hope or something. You kids out there, keep that in mind the next time your folks push you into singing a hymn at a large church gathering.

Warrant for Danger

I've had an alarming number of Internet and CompuServe messages from folks who've performed bizarre surgeries or bungled upgrades on their Macs, only to hear the dreaded Chimes o'Doom on startup. The question they all ask is, of course, "How likely is it that I can still get Apple to fix this under warranty?"

Oh dear, this does put me in an awkward situation. Technically, I should say that performing any kind of modification or upgrade to the hardware instantly voids the warranty and For Pete's Sake, People, Keep That Lid Closed, and leave it at that. But as your public servant, I have to say that as a rule of thumb, performing surgery on your Mac is like killing a business rival in an episode of "Columbo": As long as no physical evidence is left, you're in the clear. If you quite sensibly tried to install some extra memory yourself but quite unsensibly weren't wearing a grounding strap and zapped your motherboard with static electricity, chances are excellent that simply by putting everything back together again and adopting a practiced expression of befuddlement when you drop it off at the dealer, you'll be on velvet. If you were absurd enough to try to replace a low-level component like an oscillator, though, don't insult your own and the dealer's intelligence by claiming that that big scorched and melted blob was there when you bought it. Save such exotic surgeries for after the warranty's expired.

For the answers to other important consumer problems, drop me a line at *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Or you can do so electronically at 72511,204 (CIS), andyi (AOL), andy (AppleLink), or andyi@world.std.com (Internet).

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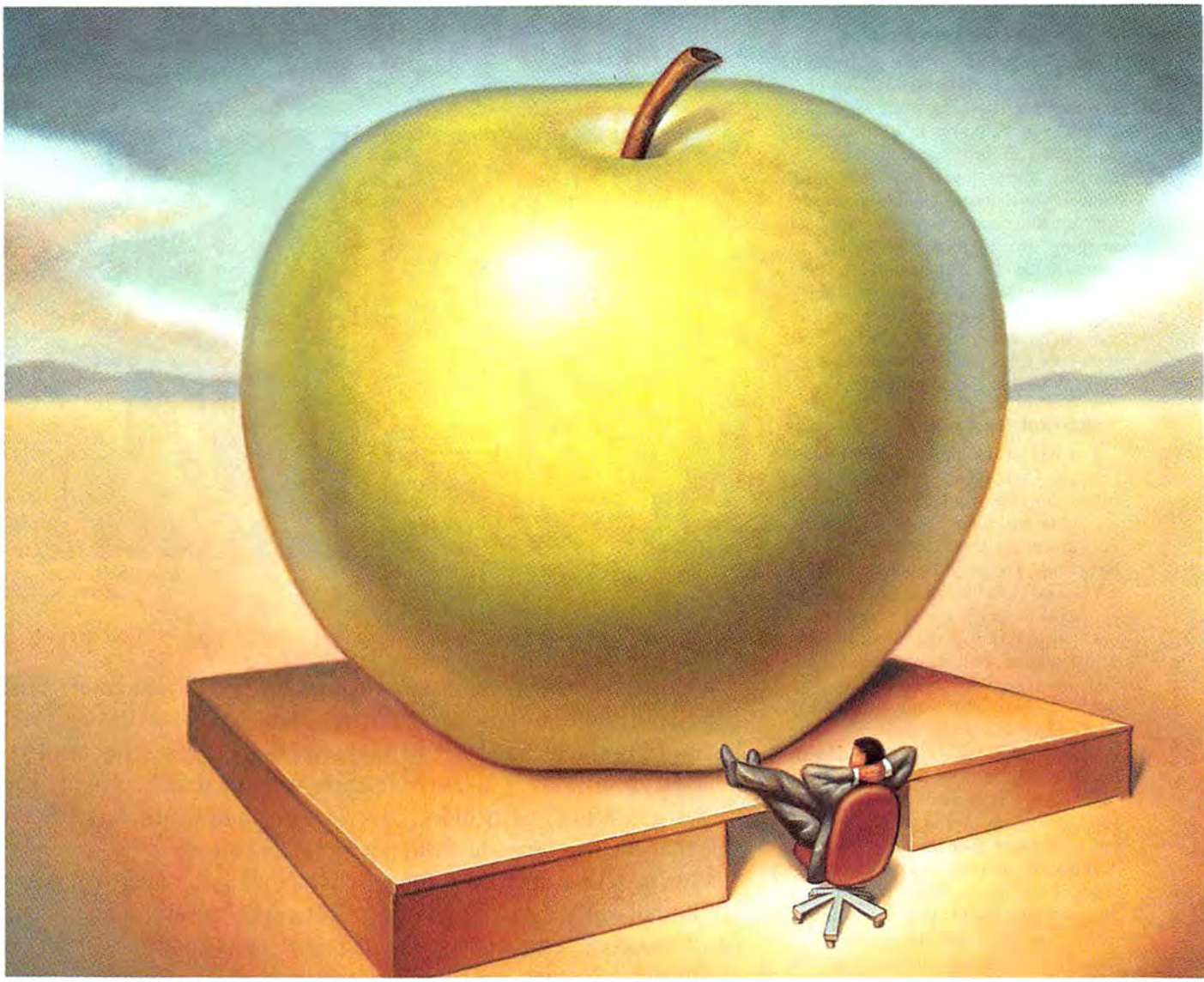
Hewlett-Packard® suggests you look beyond the obvious for your next Mac printer.



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MICHAEL SWAINE

Apple's Ticking Clock

The future of the PowerPC — and Apple — rests in the hands of independent developers.

Apple can get along just fine without John Sculley.

Anyway, that's the view of current management, which also thinks it can get along without a few thousand other employees. Does management also think Apple can get along without independent software developers?

Of course not. Apple management understands fully that Apple needs those developers more than the developers need Apple — especially as the PowerPC Macs attempt to infuse new life into the line.

Compatibility Then

In 1976, programmer Michael Shrayer launched the personal-computer word-processing industry when he invented Electric Pencil — the first time he invented it, that is.

The Golden Age of Incompatibility was circa 1976. Garage-shop engineers founded companies that flamed briefly and died, building computers that did likewise. Compatibility in this atmosphere had the same priority as table manners in the Gold Rush. Every computer had its own operating system and disk format. Porting a program from one machine to another usually meant rewriting it from scratch. Shrayer rewrote Electric Pencil 78 times.

Shrayer had opened his software business with an unlisted telephone number. (As a former cameraman for "Candid Camera," he had learned to value his privacy.) You could do that back then: Programmers could almost be troglodytes. But the children of their labors, sent out into a complex society of other programs in a harsh world of hardware devices, had to be good citizens.

Compatibility Now

In the succeeding decade and a half, that reality hasn't changed much. A couple of years ago, the leading word-processing company found that it was spending more than half of its programming resources on writing printer drivers.

If a software developer could simply build and ship an application, commitment to a platform would be less expensive and irrevocable and there would be no credible threat of Mac developers defecting to Windows. But the work's just begun when the product is done, and after delivery, the longer labor begins.

Today, an application program has to work properly with a line of computers, not just a single model; it has to deal with existing printers and other devices and with future devices as they are released; it has to deal with other active programs, some of which may try to send it messages; and it has to keep up with an evolving operating system.

And keeping up with changes in Apple's operating system is not a trivial matter. Fully implementing Apple events, for example, requires rewriting an application.

Some companies can afford to keep up. The aforementioned leading word-processing vendor, WordPerfect, just shipped the latest version of its word processor, which features support for — deep breath — PowerTalk, Apple events, AppleScript, WorldScript, and QuickTime. Almost simultaneously Claris announced a new version of MacWrite with essentially the same list of supported system features.

Others can't. As one vendor put it when asked why his product didn't support QuickDraw GX and AOCE, "I think it makes much more sense for us to concentrate on polishing the technology we have built . . . rather than chasing Apple's bleeding edge."

The situation is likely to get worse. If Apple reshapes itself as more of a system-software supplier, the pace of change in its system software will increase and so will the pressure on developers to keep up. This could be too much for some developers, who may decide that the Mac market isn't worth the effort.

It's not that developers don't want to play the game. They see the carrot and the stick: If they implement a new system-software feature, they can ride on Apple's own marketing. If they don't, they may end up selling last year's model against the competition's latest and greatest. So they do want to play; it's just a matter of time and resources.

With the PowerPC, there's less choice. Mac developers must port to the PowerPC or leave the Mac market. The question is, How soon do they have to move? Because only fast, ported applications (as opposed to relatively slow, emulated ones) will justify customers' moving in droves to the PowerPC Macs, Apple's challenge is to push developers very hard to port their applications — but not so hard that they abandon ship.

Apple knows all this, but does it know how to pull it off? Time, and not a lot of time either, will tell.

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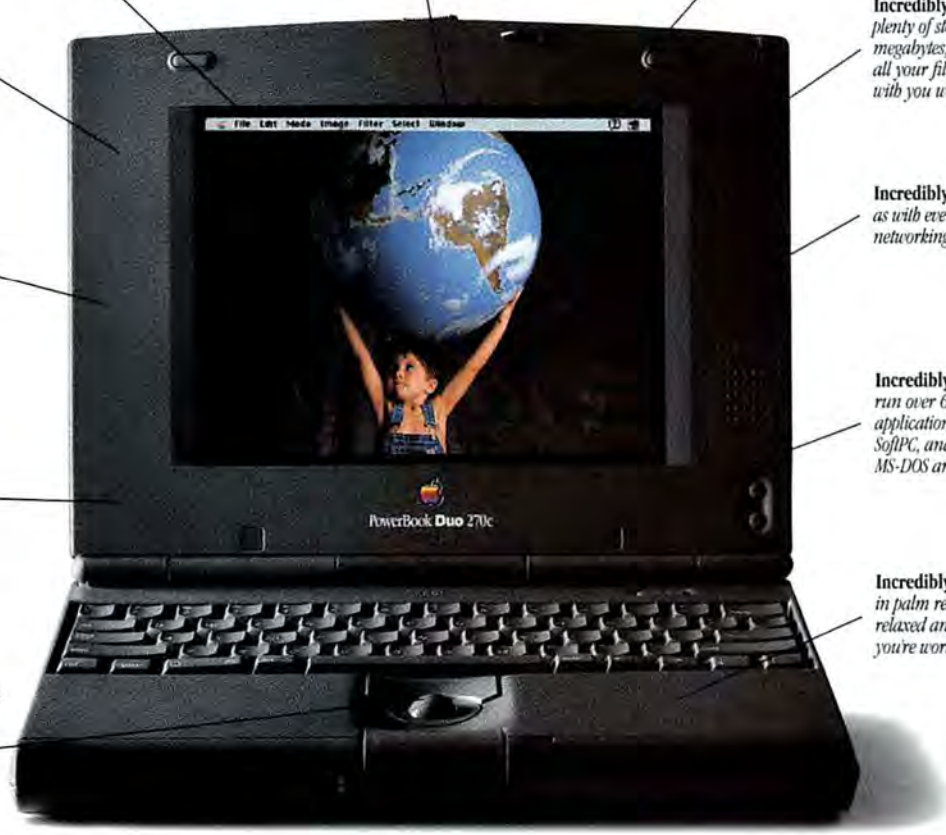

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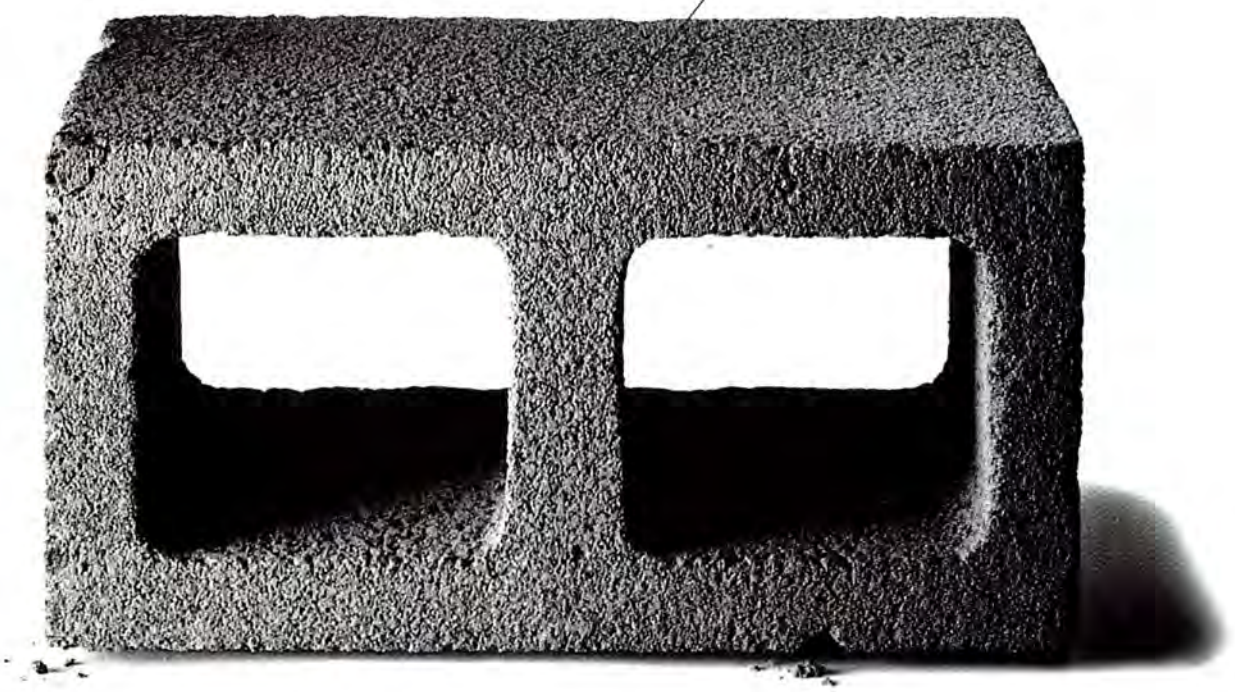

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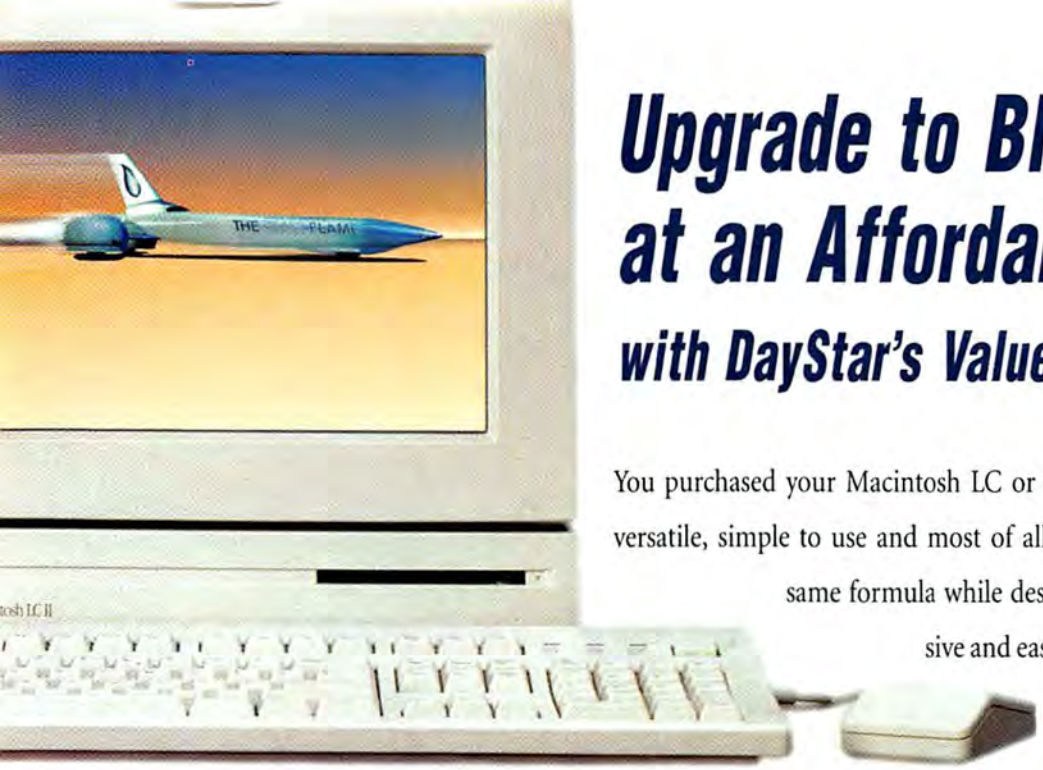

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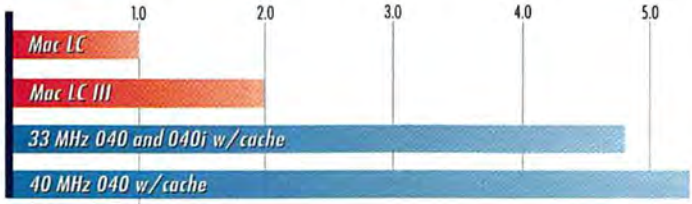

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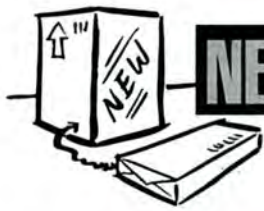

NEW ON THE MENU

On the surface, Apple's latest Mac looks enticing. A computer, TV, and CD player rolled into one sleek, black box, **the Macintosh TV** is aimed at those first-time Mac buyers, home users, and college students who want the best of all worlds at an affordable price ($2,079).

The Mac TV comes cable-ready, so you can watch full-screen cable TV on its integrated 14-inch monitor. Its RCA port connects to a VCR, camcorder, laserdisc player, or video-game player. A palm-sized remote control works with both the TV and the built-in AppleCD 300i drive, which can handle audio CDs as well as PhotoCD and data CD-ROMs. To get you started, Apple tosses in a batch of CD-ROM titles and software.

It sounds appealing, but there are glitches. First, the TV video has a true resolution of 640 x 240 pixels, so **images appear jerkier** and grainier than on a normal TV. Second, because the Mac, the TV, and the VCR don't interact, your viewing options are limited — you can't watch "The Simpsons" while you're working, for example. And although you can capture a single video frame to disk, there's no way to capture a series, even with third-party software, so whipping up QuickTime movies is out of the question. Because the internal cable-TV tuner takes up the space that would normally be given to a slot, you can't expand the Mac with additional hardware either.

The oddest thing about the Mac TV is that its video mode runs in 16-bit color but its Mac-software mode can run only in 8-bit color. QuickTime images running on the Macintosh look terribly grainy compared to today's high-quality video. As a result, some consumers will avoid CD-ROM titles that depend heavily on QuickTime, and that's a real shame.

The unit's other features are pretty standard: a 60-megabyte hard drive, 5 megabytes of RAM (expandable to 8 megabytes, tops), a 1.4-megabyte SuperDrive, a headphone jack, and two speakers. In addition to the video ports, the Mac TV has a SCSI port, two ADB ports, and two serial ports.

The Mac TV's 32-megahertz 68030 processor is a bit faster than those used in the LC III and the LC 520. But the Mac TV runs about **15 percent slower** than those two LCs, because its data bus (the pipeline that carries data between the CPU and memory) is smaller. There's no FPU chip nor any way to add one. That isn't a problem for most applications, but college students who plan to use scientific and mathematical programs are advised to check those applications' requirements carefully beforehand.

Apple is testing the market for the Mac TV by selling it at universities and through a few retail outlets in the Midwest; New York; Washington, D.C.; and Miami. It's also available through *The Apple Catalog*. 800-795-1000.

By Cheryl England

System 7 Turns Pro

For the first time since Apple rolled out the 128K Mac, there are two versions of the Mac operating system: the base System 7 ($49, which continues to ship with Macintosh CPUs) and the business-oriented System 7 Pro ($149, available separately). System 7 Pro contains System 7.1.1, AppleScript 1.0, QuickTime 1.6.1, and PowerTalk 1.0. As the client portion of AOCE (Apple Open Collaboration Environment), PowerTalk gives you e-mail and directory services without the need for a server, just as System 7.0 brought file sharing without a server (see "System Software for the '90s," December '93, page 105). PowerTalk also integrates mail, directories, and security in PowerTalk-savvy applications.

The first applications out of the gate with full System 7 Pro support are MacWrite Pro 1.5 ($249), from Claris (408-987-7000), and WordPerfect 3.0 for Macintosh ($495), from WordPerfect (801-225-5000), which let you send and receive e-mail from within documents. Both programs are also AppleScript-able and allow you to run QuickTime movies in their documents.

PowerTalk doesn't replace your current e-mail; it extends the reach of your current messaging system. For example, AOCE gateways for QuickMail and for Microsoft Mail ($99 each), from StarNine (510-649-4949), are PowerTalk modules that allow you to use any mail-enabled application as a front end to QuickMail or Microsoft Mail or to any communication type (such as fax, voice, or the Internet or another on-line service) that PowerTalk supports. CE Software (515-221-1801) has its own QuickMail-like front end that also works with anything PowerTalk works with. Beyond, Inc. (617-229-0006), a big name in e-mail in the PC market, has announced PowerRules, a mail front end that can automatically filter, forward, and reply to messages.

Other useful PowerTalk add-ons include FAXstf 3.0 Pro, from STF Technologies (816-463-7972), which lets you send faxes from mail-enabled applications and receive faxes in System 7 Pro's desktop mailbox; Useful Voice Processor for Macintosh, AOCE Edition, from Useful Software (508-774-8233), which does the same for voice messages; and the group-scheduling program Team Agenda 1.5, from MacVonk (215-660-0606), which locates users in PowerTalk's desktop Catalogs and Business Cards databases.

— John Rizzo

With PowerTalk, AppleScript, and QuickTime built-in, System 7 Pro offers unprecedented communication flexibility right out of the box.

Hewlett-Packard's DeskWriter 310 brings sharp color printing to PowerBook users. It's a lightweight too — just 4.3 pounds and $379.

PHOTOGRAPH: GIAMPIERO BENVENUTI

Color Pages on the Road

PowerBook-toting travelers who need to print an emergency color overhead for that morning's meeting have been out of luck. But now Hewlett-Packard's new portable printer makes on-the-road color printing practical.

Weighing in at a mere 4.3 pounds, the compact HP DeskWriter 310 inkjet printer for PowerBooks produces sharp 300-dpi color text and graphics for $379 ($455 with the 60-page sheet-feeder attachment). For color printing, you snap out the black-ink cartridge bundled with the printer and replace it with a color one (it takes the same cartridge as the DeskWriter 550C). Additional cartridges are $35 for color and $22 for black.

It pumps out black-only pages at three pages per minute and color pages at four minutes per page. Powered by the included AC adapter, which tips the scales at only 10.5 ounces, the DeskWriter also runs off a single one-hour battery ($49) that lets you print as many as 100 pages per charge. A two-battery recharger ($99) doubles as an AC adapter. RS-422 and AppleTalk interfaces make for easy connection to desktop machines and PowerBooks. 800-752-0900 or 208-323-2551.

— Pamela Pfiffner

New Fax on Macs

Delrina, long at the forefront of fax-modem software in the Windows world, has turned its eyes to the Mac, where it hopes to give STF Software's FAXstf, long the uncontested leader in nonproprietary fax software, a run for its money.

Priced at $129, FaxPro Mac offers several features that are lacking in other programs, including gray-scale faxing with preview, on-screen antialiasing, and built-in OCR using Caere's AnyFax technology. FaxPro's flexible addressing, cataloging, and queuing options let you centrally set up standard phone prefixes and maintain multiple address books with time parameters for broadcast dialing. You can import ASCII text from other address books and create custom cover pages. Fax-management windows let you view sent, unsent, and received mail — as well as failed faxes in the Dead Letter window.

FaxPro Mac installs by querying the modem to select the right setting. It supports most popular fax modems, including Class 1 and Class 2, as well as some outdated fax modems — the Orchid Macfax, for instance, and AppleFax, Apple's original fax modem. The FaxStatus DA monitors modem status. You can access the driver from the Chooser or through the Control Panel, or to send single

The projectors in Proxima's Desktop Projector line give you powerful presentations in a portable package.

pages quickly, you can drag files and drop them onto the FastFax icon. 800-268-6082 or 408-363-2345.

— Stephan Somogyi

Crowd Pleaser

Presenting information to a crowd these days often means connecting a PowerBook to an LCD panel, but that setup still requires a bulky overhead projector that only dimly illuminates your vivid presentation. A better solution may be Proxima's new all-in-one color projectors, which are portable and powerful.

Members of the Desktop Projector line weigh as little as 18 pounds and measure less than 6 inches high, with a footprint of just 13 x 17 inches. The Desktop Projector is a self-contained box during transport, and when you lift its lid, its projection lens and mirrors pop out. Using a maze of mirrors and lenses, the Desktop Projector focuses a 410-watt quartz halogen lamp through its internal 640-x-480-pixel LCD panel, yielding stronger light and brighter colors than an overhead projector. Images look better too: Proxima's proprietary electronics system ensures improved color fidelity, and built-in keystone correction minimizes image distortion.

Proxima's Desktop Projectors come in three models. The video-ready 2800 ($8,995), geared toward multimedia pros, boasts foldout stereo speakers and an active-matrix color LCD that supports 16.7 million colors. The 2700 ($7,995) is essentially the 2800 without the built-in digital video processor and dual stereo inputs; a video adapter is available for $695. The entry-level 2300 ($4,995), aimed at the data-presentation market, sports a supertwist LCD panel that supports 24,389 colors. 619-457-5500.

— Pamela Pfiffner

Let It Bleed

So far, most dye-sublimation printers for full-bleed printing on tabloid-sized paper have used software interpreters, meaning you tie up a Mac (probably yours) while printing. The problem is that hardware interpreters cost too much and aren't readily upgradable. Now Tektronix addresses one of those concerns with the Phaser 480, an affordable (relatively speaking) unit for tabloid-sized, full-bleed printing that has an internal PostScript Level 2 hardware interpreter.

The Phaser 480 fills the gap between color-proofing devices and design-comping printers. It uses the same type of Shinko engine as the 3M Rainbow color proofer but costs several thousand dollars less, at $14,995. It also includes some technologies that produce better color, including TekColor PhotoFine, for crisper line printing, and Dynamic Correction, for better press simulation.

The combination of a 24-megahertz AMD 29000 RISC processor, a new data-compression scheme, and memory management boosts printer throughput. Tektronix claims the Phaser 480 prints a 10-megabyte file in about a minute. It ships with 32 megabytes of RAM and can be upgraded to 64 megabytes. 800-835-6100 or 503-682-7377.

— Pamela Pfiffner

POWERPC WATCH

Pentium Propaganda

Why Is Intel Worried?

Intel is experiencing a new sensation for the first time in its personal-computer history: worry. Why? Because PowerPC is evolving from a grand-sounding scheme to a tangible threat to the 80x86 monarchy.

Early last October, Intel ran ads in major Mac publications (including this one) extolling the virtues of Intel chips: software compatibility, a good price/performance ratio, and the ability to "run all your favorite Macintosh applications." The word *PowerPC* doesn't appear once in the ad copy, but if these ads don't validate PowerPC's importance, we don't know what does. So let's deconstruct Intel's claims.

Compatibility: With what? Although some applications are available for both Windows and the Mac, many aren't. Migration to Windows has never been easy, and the new Intel Pentium CPU chip is not making that any easier. By touting the Pentium's compatibility, Intel is revealing that it doubts the compatibility of the 68020 emulator built in to each PowerPC Macintosh. The emulator's not even finished yet, however, and early reports about compatibility are surprisingly favorable.

Price/performance ratio: Although it's true that the 68000 family isn't such a great performer anymore, the PowerPC 601 chip compares favorably with Intel's top-of-the-line Pentium. Let's not forget that the 601 is at the low end of the PowerPC family's performance spectrum and costs about half of what the Pentium does.

Finally, let's look at the **future.** Intel's next-generation processor, the P6 (the Sextium?), isn't due before early 1995 — or later, given Intel's Pentium track record. The 601 and the 603 are here now (in September IBM shipped its first 601-based workstations and sneak-previewed a prototype of a PowerPC laptop that looks very much like IBM's existing Intel-chip-based ThinkPad laptops). The 604 and 620 chips will be available in sample quantities by year's end. And more important, the 601 and 603 were released exactly when Apple, IBM, and Motorola said they would be. Performance will keep improving too. The 604 is expected to be about twice as fast as the 601, and the 620 should be significantly faster than that.

Plenty of questions about the success of the PowerPC Mac remain, but in the areas Intel claims compare favorably with the Mac, a closer look reveals more obfuscation than clarification.

— Stephan Somogyi

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VIDEO

Premiere 3.0

Adobe Premiere rates Critic's Choice for best QuickTime moviemaking software.

Adobe Premiere has long been the Mac's top-rated QuickTime video-editing program. Version 3.0 continues the tradition, adding new professional-level video-production tools that make Premiere even more efficient and powerful than the previous version.

Adobe Premiere 3.0
Published by: Adobe Systems, Inc., 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94043; 415-961-4400.
List Price: $695; $795 for CD-ROM version. Upgrade for 2.0 owners, $179; $249 for CD-ROM version.

On with the Show

Although Premiere's interface has been somewhat improved with version 3.0, its general design hasn't changed in any major way, so those familiar with previous versions will feel right at home with the latest release. Veteran users will, however, notice a difference when they first boot the program. Instead of opening a new document, Premiere 3.0 displays the handy New Project Presets dialog box, which allows you to select from a list of project settings. The settings determine movie frame rate, preview and output options, compression schemes, and project time base (the desired number of frames per second for your production).

In addition to the settings that ship with Premiere, you can create your own sets of default options — a real time-saver for those who use Premiere in conjunction with unusual hardware configurations such as full-motion-video-compression cards.

The first step in digital moviemaking is to assemble movie elements, or clips. Premiere 3.0 helps automate this process with batch video digitizing. When you team Premiere with a tape deck, you can log multiple video clips by controlling the tape deck from within Premiere. The software then automatically runs the tape and captures each clip to a separate QuickTime movie. This feature is an important time-saver for production-oriented environments.

Another welcome feature is the ability to save movie-digitizing settings — including color, brightness, and volume — as files. That means you don't have to reenter the settings for each digitizing session.

Once you've imported the elements for your movie into Premiere, the real fun begins. Version 3.0 can manage much more data than its predecessor. You can now work with as many as 99 movie tracks and 99 audio tracks. Premiere 2.0 provided only a single Superimpose track with adjustable matting and transparency settings. The Construction window in version 3.0 retains Premiere's dual-main-track metaphor but lets you superimpose as many as 97 additional tracks. You can adjust motion, filters, and transparency for each track.

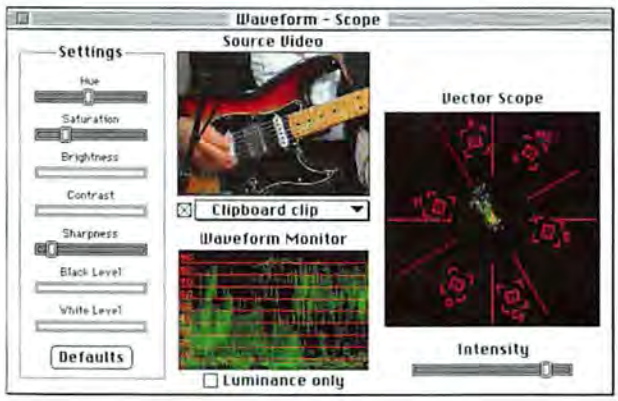
For professional-quality sound, Premiere 3.0 provides complete support for the new Apple Sound Manager. The program lets you use as many as 1,000 markers to mark beats and to snap edits to audio tracks.

Overall, Premiere's significantly improved data handling should go a long way toward satisfying the needs of advanced videographers and special-effects enthusiasts. Although the program's layers implementation is not nearly as fine-tuned as that of CoSA's After Effects, it is quite workable. In most other regards, Premiere's core set of editing tools — which contains just about everything digital moviemakers require for everyday editing tasks — is exactly replicated in version 3.0.

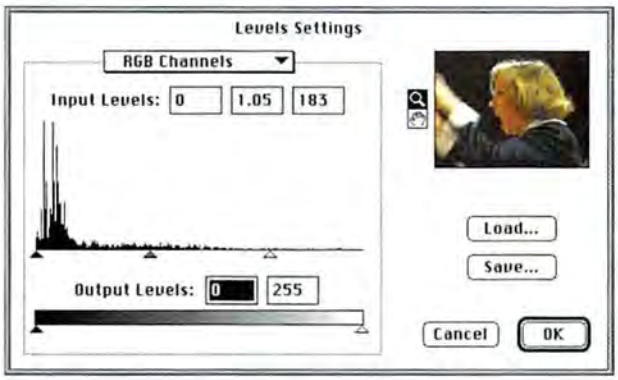
Although Premiere's motion-control interface hasn't changed significantly with the new release, the results you obtain are much improved. Premiere now calculates motion at the subpixel level, which gives you smooth motion and rotation. This enhancement greatly extends Premiere's usefulness for professional-quality work.

Adobe has also added important new capabilities to Premiere's Title window, which you use to create type and graphics. New title effects include drop shadows, true soft shadows, and gradient fills. You can apply shadows to primitive objects, including boxes and circles. There's also a new polygon drawing tool. These enhancements provide an easy way to add basic graphic elements to movies.

In addition to Premiere's major new features, you'll find a plethora of subtle additions and interface tweaks scattered throughout the program. New preview features include the ability to preview edits at full motion and full size. The zoom tool and the hand tool are now



Adobe aims to please video professionals with Premiere 3.0's sophisticated new features. The Waveform Monitor, shown here, lets you adjust digitized signals as you capture a movie to disk.



For previewing operations in Premiere 3.0, the zoom and hand tools (upper right) let you closely inspect the results of applying different effects and settings.

available for previewing operations, so you can closely inspect the results of applying various effects and settings.

New overlay and transparency controls for superimposing tracks let you create a variety of stunning masking and compositing effects. Most noteworthy are the Multiply and Screen options, which work just like their Photoshop counterparts do.

Another valuable new feature is the Waveform Monitor, which measures the color purity and calibration of video signals. These capabilities were formerly available to video professionals only with a costly hardware device. Premiere's software implementation provides built-in color bars and other calibration references that let you adjust the digitized signal before you capture a movie to disk. Last, the Movie Analysis command provides helpful, detailed information about any QuickTime movie, including file size, number of video and audio tracks, data rates, exact frame durations, and compression settings.

In Transition

New transition effects in Premiere 3.0 add pizzazz to your productions. The Additive Dissolve effect allows one track to fade into another in a far more visually pleasing way than with the standard Cross Dissolve effect. The Curtain effect treats one layer like a curtain that opens to reveal an underlying layer. Similar to Photoshop's filter of the same name, the Displace effect uses the green and red channels of one movie to displace the pixels in another movie, resulting in customizable animated distortion effects. The Fold Up effect causes an overlapping movie to gradually fold up like a piece of paper, revealing the underlying layer. Other noteworthy effects include Multi-Spin, Slash Slide (in which a new layer "rains" onto an underlying layer in streaks), Swap, and Swirl.

New filter effects include Animated Blur, which causes one layer to gradually go into or out of focus; the Convolution kernel, similar to Photoshop's Custom filter, for customized blurring, sharpening, and embossing effects; Extract, a programmable threshold effect that's useful for creating masks; Field Interpolate; Image Pan, which lets you move around within a magnified view of a layer (similar to the image processor in the movie *Blade Runner*); Levels, a welcome new brightness and color control; Resizing; Cropping; and Video Noise.

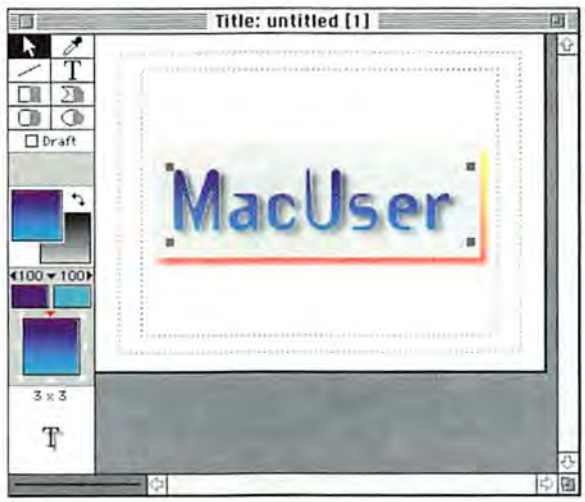
All in all, Premiere 3.0's bag of tricks in the special-effects area is impressive. Although aficionados of dedicated special-effects programs such as VideoFusion and After Effects still will not find a compelling reason to switch exclusively to Premiere, virtually every Premiere user will be more than satisfied with the program's expanded offerings in this area.

The Premiere 3.0 documentation is clear and accessible. It includes a color "Tips and Techniques" section (the rest of the manual is black-and-white) and an excellent index. Adobe also offers a CD-ROM version of the program that comes with additional support files, multimedia-based expert tips, the entire user guide in Acrobat format, a full-length video by acclaimed avante-garde video artist John Sanborn (with additional production notes and tips by the artist), stock images, QuickTime movies, and more. Owners of Premiere 2.0 can upgrade to the CD-ROM version for $249.

The Bottom Line

Premiere 3.0 is a comprehensive update to an already powerful program. Adobe has increased the number of video and audio tracks Premiere can handle, a boon for advanced video professionals and special-effects aficionados. Numerous other enhancements, such as the inclusion of a zoom and a hand tool for preview operations, are clear evidence that Adobe is paying close attention to feedback from current users of Premiere. Anyone already using Premiere should upgrade to version 3.0 — it's well worth the $179 upgrade price. For those who are looking for their first one-stop professional digital-video-editing environment, look no further than Premiere.

— *David Biedny*



Adobe has significantly enhanced Premiere's Title window. New title effects include drop shadows, true soft shadows, and gradient fills.

NETWORKING & CONNECTIVITY

WordPerfect Office 4.0

The perfect workgroup communications tool? Not yet.

MacUser LABS WordPerfect Office 4.0, with its built-in cross-platform calendar and group-scheduling environment, sounds like a great leap ahead of other e-mail systems for multiplatform offices (the program supports Mac, DOS, and Windows clients and will support UNIX ones in the near future). Unfortunately, once we'd set WordPerfect Office up in our labs, we found the program's problems more noteworthy than its benefits.

WordPerfect Office 4.0
Published by: WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 800-451-5151 or 801-222-5000.
List Price: Server software, $295; 5-user client pack, $495.

Getting Started

WordPerfect Office stores e-mail messages, calendars, and group-scheduling data in one server database, so installation and administration are fairly straightforward — even though the server software runs on a PC and the administration software (which can run on the server or on any PC connected to it) is DOS-based. Creating new users is somewhat tedious, but you can import user lists from NetWare, VINES, and other network operating systems. The WordPerfect Office server software has to run on a file server (unlike Microsoft Mail and CE Software's QuickMail, which can run on a server that has no file-server capabilities), but the server doesn't have to be NetWare- or VINES-based; you can also use less expensive AppleTalk PC servers, such as those running Farallon's Timbuktu for Windows or Miramar's Personal MacLAN Connect.

Logging on to a WordPerfect Office server (called a Post Office) as a user, you encounter a variety of icons — My Calendar, Send Mail, Schedule, Assign Task, Write Note, and Phone Message — representing tasks you can perform, but most tasks quickly take you straight to the program's e-mail roots. When you double-click on them, all the icons except My Calendar and Phone Message bring up nearly identical e-mail forms (custom e-mail forms won't be an option until version 4.0A, which should be shipping by the time you read this). When you propose a scheduling item, for instance, you actually just send an e-mail message (with enclosed files, if you like) to the users you want to invite to a meeting; they then respond with messages of their own.

Options available for these tasks do go beyond e-mail, however. When you schedule an event, for example, you have the option of requesting a resource, such as a conference room or a piece of equipment; the owner of that resource can either approve or deny your request. Another powerful feature lets you search other users' calendars for conflicts during a time you've specified, so that you can find a meeting time when everyone is available; however, getting this feature to work properly can be tricky.

Group-scheduled items appear on your calendar, which also displays your personal tasks in daily, weekly, and monthly views. Some aspects of the display are awkward, though. The Graphics mode blocks out chunks of time with boxed events but doesn't show multiple events scheduled simultaneously. The List mode, which uses brackets to show event start and stop times, can show simultaneous events, but it does so by listing the start times twice. Also annoying is the large minimum size of the calendar window — it's approximately the size of a Classic's screen, and you can't shrink it.

Still, the calendar does have useful features, such as the Proxy capability. Designating assistants as your proxies is a handy way to give them appropriate types of access to your calendar (creating events or just reading them, for example) while still being able to protect private events as necessary.

WordPerfect Office's main window shows the program's breadth of services, including e-mail, calendaring, and scheduling.

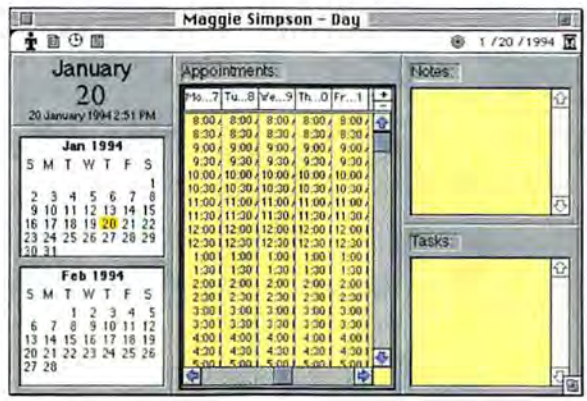
Mail Imperfect

The e-mail focus of most of this product's functions is not necessarily a bad thing, except that WordPerfect Office's e-mail is far from problem-free. Not that it lacks features — you can store messages in folders, search for text describing a mail item, view status reports on sent messages, filter the items displayed in your In Box, get return receipts for mail and scheduled tasks others have accepted, and even use rules to set up automatic responses to such events as the arrival of new mail (filing it in a particular folder, based on certain attributes, for example). The problem is that WordPerfect Office's e-mail is both buggy and more difficult to use than the Big Three cross-platform mail packages — Lotus' cc:Mail, Microsoft Mail, and QuickMail.

Message addressing is just one area in which the program lacks usability. You can click on an Address button in the mail form to bring up the Address Book window, which contains a list of users, and then double-click on names to put them in the Send To field — so far, so good (except that the Address button isn't very near the To field on the mail form). But then, once you've selected recipients in the Address Book, you can't review their names on the mail form. You can scroll with your left- and right-arrow keys in the tiny, one-line To field, but all you see there are the recipients' addresses. If you bring up the Address Book again, you find that the recipients are no longer listed in the Send To field.

WordPerfect Office is filled with such quirks. When you're sending mail, for example, the Attach button appears only after you've already attached one file by using a menu option. And often, when you try to reopen a window (your calendar, say) that you've already opened from the main window, it opens another copy of it rather than going to the one that's already open.

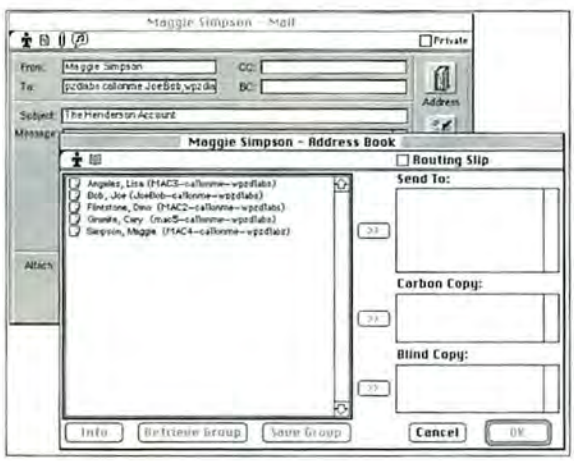
WordPerfect Office doesn't consistently support Mac interface conventions, so your best guess at how something works is often wrong. For instance, you can't use Shift-select to select multiple items. Also, where the click-and-drag capability is available for names, you have to click on small icons rather than on the names themselves. You *can* launch attached files from within WordPerfect Office, but unlike with cc:Mail or Apple's PowerTalk, a double-click doesn't work; you have to select the Launch option from the Attachments window.



Among the puzzling elements in WordPerfect Office is this weekly view in List mode — the appointment descriptions are totally obscured.

We also encountered some bugs in the shipping version of WordPerfect Office 4.0 we evaluated. Some of these were drawing problems, manifesting themselves as windows that didn't work quite right (WordPerfect was hoping to clear up this problem in version 4.0A). Other problems, such as garbled return receipts, remained a mystery. However, we encountered no serious errors that would cause a server to crash. And, fortunately, the tech support for WordPerfect Office is first-rate, as we discovered when we called in with questions without identifying ourselves as being from *MacUser*.

Beyond bugs and interface quirks, there's also the issue of speed. We found WordPerfect Office sluggish, particularly when opening messages, even though we used a fairly high-performance, 12-client Ethernet test network (10 Macs, 2 PCs), with a 486 PC running NetWare 3.11 as our file server. Speed may be less of an issue by the time you read this, though, because WordPerfect claims that version 4.0A will increase it greatly.



Message addressing in WordPerfect Office is clumsy. Once you've selected recipients, you can identify them only by scrolling through the tiny To field (top left), which shows addresses only. And the names you've selected don't show up in the Send To field when you reopen the Address Book.

The Expandable Office

On the positive side, one thing the WordPerfect Office program has going for it (besides some handy, if not always well-implemented, features) is expandability. The WordPerfect Office architecture includes the concept of a domain, a group of servers that share directory information with each other. Once you've created domains — and set up a message server on a PC to handle the communications among Post Offices — any changes made to the user information on one server are automatically distributed to the others.

WordPerfect Office also uses message servers to connect through gateways to other standard mail formats, including Novell's MHS, X.400, and SMTP (for Internet access). In addition, the program allows remote access, but for PC clients only (WordPerfect says this feature will be added for Macs in an upgrade due sometime during the first quarter of 1994). Currently, Macs can access WordPerfect Office remotely only by using AppleTalk Remote Access to dial in to a Mac on the network — not a speedy option.

The Bottom Line

The concept of using a single network application for both e-mail and scheduling is an attractive one. Unfortunately, developing such an application has proven an elusive task. No company has really managed to get it right yet. Although WordPerfect Office may sound great to MIS directors, its interface inconsistencies, bugs, and sluggish speed will leave most Mac users dissatisfied.

— John Rizzo

Burt Jensen, of ZD Labs, managed the testing for this review.

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OUTPUT DEVICES

Apple Personal LaserWriter 300

Buyers get what they pay for with Apple's lowest-cost laser printer.

If you've been waiting for laser printers to become affordable enough to deserve the label *personal,* you may be excited to hear about the new low end of Apple's LaserWriter line. The Personal LaserWriter 300 is a compact, energy-efficient, 300-dpi QuickDraw laser printer with gray-scale-printing capabilities — and a price less than $700. Don't get too excited, though. This printer's so-so speed, lack of upgrade options, and other limitations make it suitable only when your budget is the driving consideration.

Apple Personal LaserWriter 300
Manufactured by: Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010.
List Price: Anticipated street price, $699. (This unit is sold only through Apple's Performa dealers; for information about dealers in your area, call 800-538-9696.)

Back to Basics

The Personal LaserWriter 300 is a step down in most respects — especially in terms of output-enhancement options and speed — from the LaserWriter Select 300 (see review, October '93, page 52). It lacks the Select 300's upgradability (for PostScript and for Apple's PhotoGrade gray-scale-enhancement software) as well as its FinePrint resolution-enhancement technology and optional paper trays. The Personal LaserWriter 300's one paper tray can hold as many as 100 sheets of letter-, legal-, A4-, or executive-sized sheets, but you can't add a second tray or envelope feeder; you're required to feed envelopes or special stock manually.

The Personal LaserWriter 300's Canon engine is rated at a maximum of 4 ppm (pages per minute), compared to 5 ppm for the Select 300's Fuji Xerox engine. In both cases, because the printers use your Mac's CPU to do the print processing, speed varies according to the Mac model the printer is connected to. The Personal LaserWriter 300's one tangible advantage is its light weight (15 pounds) and compact size (15.2 inches long by 14.9 inches wide by 6.3 inches high); it's about half the weight and two-thirds the bulk of the Select 300.

The Personal LaserWriter 300 is also modest in its energy requirements, in order to comply with the EPA's Energy Star program. Like the HP LaserJet 4ML, it automatically goes into idle mode when it's not printing, so you don't need to worry about turning it off when you finish a job. Toner cartridges for the Personal LaserWriter 300 come with a UPS mailing coupon that lets you mail used cartridges to the Apple Cartridge Collection Center, free of charge, for recycling.

Your first cartridge comes with the printer, as do the other items you need to get started: a standard Apple Peripheral-8 DIN cable and power cord (both of which the printer holds in place with doors that flip over the printer ports), 39 TrueType fonts, and an installer program.

A special extension lets you use Apple's unique GrayShare technology to share the printer among two or more Macs on a LocalTalk network. This setup isn't as good as having a true network printer, but it works.

We tested the Personal LaserWriter 300's speed and output quality by printing standard MacUser Labs gray-scale images and text files. The results were not impressive.

The 300-dpi, gray-scale-capable Apple Personal LaserWriter 300 has low space and energy requirements *and* a low price.

A full-page, gray-scale image took four and a half minutes to print, on average, from our Mac IIcx (which was running System 7.1 and had 8 megabytes of RAM) — 50 percent longer than the LaserWriter Select 300's three-minute time to print the same image. That time could differ considerably with other Mac models, of course, because the Mac does all the print processing. The printing was clear, although pronounced banding marred the image's gradient fill.

More disappointing were the results of our text-printing tests, which were designed to measure the Personal LaserWriter 300's ppm rating. Apple rates the printer at 4 ppm under optimal conditions (a fast CPU and simple text with little or no formatting), but the best we could manage was 2 ppm, or 30 seconds per page — and this was using the text-specific speed trick of selecting the Black & White printing option in the Print dialog box. As for the type quality, it was acceptable for personal use but was not exceptional. Some jaggies occurred, especially at large point sizes.

The Bottom Line

The Personal LaserWriter 300 is a 300-dpi laser printer with few noteworthy features. True, it's inexpensive, ecologically correct, fairly compact, and capable of gray-scale printing. But it's not big on speed, output quality, or upgradability. It confines you to one paper cassette and relies on your Mac for its processing speed (or lack thereof). Apple's Personal LaserWriter NTR is obviously an alternative, as are Apple's Select-series printers. And even PostScript printers are now dropping well below the $1,000 mark. So think seriously about saving your pennies a while longer — a little patience may help you avoid buying a printer you'll quickly outgrow.

— *Gregory Wasson*

Rae Assist

Rae Technology's comprehensive super-PIM loses points on speed and usability.

Rae Assist breaks new ground in the PIM arena with its intelligent new tools for organizing and interconnecting personal data. But there's a catch: The flip side of Assist's innovative design is mediocre speed and several major gaps in its feature set.

Rae Assist 1.0.2
Published by: Rae Technology, Inc., 19672 Stevens Creek Blvd., Suite 195, Cupertino, CA 95014; 408-725-2850.
List Price: $199.

Electronic Binder

Rae Assist aims to provide a complete solution for personal information management. The program uses an electronic-binder metaphor for storing information. The binder provides six basic modules — People, Companies, Planner, To Do, Projects, and Items — to help you organize a wide variety of data. The Projects module enables you to group all the data associated with a common activity. The Items module can contain free-form text, graphics, and QuickTime movies.

Standard PIM features include automatic field formatting, customizable fields and indexing, and the ability to navigate among modules. However, Assist's maker, Rae Technology, has positioned the program as more than just another PIM. Three features distinguish Assist from competing programs: tags, links, and the Assistant.

Each data type — person, company, event, to-do item, project, note, and picture — is called an object. Tags enable you to group objects into custom categories, such as Friends, Urgent, and Cubs Fans. You can create as many tags as you like and search for and list objects by using the tags.

Even more powerful are Assist's links, which let you cross-index the objects in your binder. Assist provides general links, which let you link any object to any other object or objects (there's no limit to the number of links an object can have), as well as specific links, which enable you to link an object to a specific object type (for example, each company object has links to people objects in its employees-list box. Links provide a unique way to navigate among related objects.

The Assistant provides intelligent agentlike functions for events and to-do items that will sound familiar to Newton owners. For example, when you type in a new event, the Assistant recognizes keywords in the event's description, assigns the event the appropriate type (food or phone, for example), and creates links to related objects. If the Assistant finds more than one related object, it displays the list of objects so you can select the right one.

Assistance Required

Perhaps the single biggest problem with Assist is its speed. Even on a Centris 650, we often found Assist unacceptably sluggish for a PIM. And its innovative bells and whistles aside, the program is missing some essentials that competing packages provide. For example, you can't reschedule events simply by dragging event objects to a new calendar day. In addition, Assist can't automatically dial phone numbers for you and it doesn't have an alarms feature.

Rae Technology apparently designed Assist to be your primary application. The program's Binder window fills the entire screen on a PowerBook, and it's not resizable! Moreover, Assist stores many files (including the Assist application) in a folder in the System Folder, ignoring the Preferences folder. Finally, Assist is disk-based, which allows for excellent data integrity but is a big drawback for PowerBook users running their machines on battery power.

Assist is RAM-hungry. Its base configuration needs 2.5 megabytes of memory and about 5 megabytes of free disk space. If you want to run the program in 8-bit mode for 256 colors, Rae Technology suggests you add another 500K.

The Bottom Line

Flexible and tightly integrated, Assist offers some tantalizing glimpses of next-generation PIMs. It lets you collect and organize more types of personal information than any other PIM you can buy. It's also astonishingly stable — we found no significant bugs in the 1.0.2 release. Because of its mediocre speed, gluttonous resource demands, and lack of many standard PIM features, however, Assist has a hard time competing with other available PIMs.

Rae Technology is reportedly hard at work readying an update that will fill many of the gaps in Assist's feature set. But for now, we can't recommend the program to users of PowerBooks or other Macs with limited RAM and CPU power.

— Jeffrey Sullivan

Rae Assist may be slow for a PIM, but it's smart. The program's Assistant automatically categorizes new events and creates links with related objects in its database.

CAD

MacDraft 3.0

MacDraft graduates from draw program to solid drafting tool.

At last, MacDraft lives up to its name. The latest release provides a solid set of precision 2-D-drafting tools that enable the program to compete successfully with other low-cost 2-D-CAD programs, including Autodesk's Generic CADD and Graphsoft's Blueprint. And MacDraft's clean, easy-to-use interface makes it an ideal tool for novices.

MacDraft 3.0
Published by: Innovative Data Design, Inc., 1820 Arnold Industrial Way, Concord, CA 94520; 510-680-6818.
List Price: $399.

Another Dimension

With version 3.0, IDD completely revamped MacDraft's dimension tools to conform to ANSI standards. The new tools use informative on-screen prompts to help you identify the start, end, and anchor points of dimension lines. MacDraft supports all common dimension types, including linear, radial, diametral, and angular. The only missing features are ordinate dimensioning and labeled leader lines. The handy circle-center-mark tool indicates the centers of circles, arcs, and ellipses.

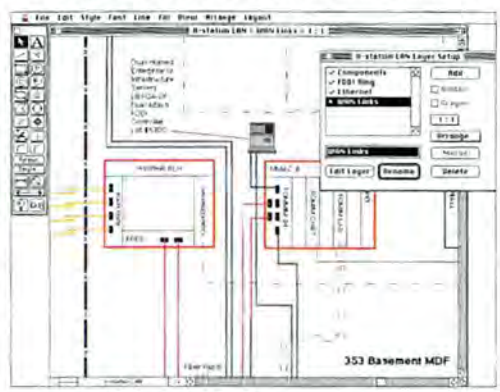
Associative dimensions are objects that can incorporate a variety of drafting formats, including witness lines and extension gaps. You can reposition dimension lines and alter dimension values in objects by simply dragging selection handles: MacDraft resizes witness, extension, and leader lines accordingly. One inconvenience, however, is that the program doesn't provide an easy way to individually modify the number of decimal places used for each dimension in a drawing.

New geometric tools include a parallel-line, a parallel-polyline, and a parallel-polygon tool, which support left, right, and center alignment; various styles of end caps; and beveled or plain-corner joints. Parallel-extrude tools let you quickly create pairs of lines by using an existing line, rectangle, or polygon. Together, these new tools streamline the process of creating such things as walls for architectural plans and pipes and cables for piping and wiring diagrams.

Other helpful enhancements include a perpendicular-line tool that automatically draws a line at a right angle to an existing object; a tangent-line tool that draws a line tangent to an arc or a circle; and a regular-polygon tool.

You can edit your drawings by trimming and extending lines, creating chamfers and fillets, and snapping to grid points. MacDraft also lets you snap to arc and circle centers and to object end points; the program doesn't let you snap to object midpoints or intersections.

One especially nice feature is the ability to move a selected line segment by dragging the selection handle at the line's midpoint. Most other CAD programs require you to move each end point separately. Object rotation is also nicely implemented. You can rotate objects in 1- or 5-degree increments or use constraints to rotate objects in minutes, seconds, or decimal fractions of degrees. A Distribute On Line command evenly distributes selected objects along a line.



MacDraft 3.0 provides a solid complement of 2-D-drafting tools.

Missing, however, are automatic commands for creating rectangular or circular arrays and a convenient way to scale objects.

The MacDraft drawing environment supports English and metric units as well as a wide range of drawing scales. You can associate different scales with different drawing layers.

Not only is MacDraft a fine drafting tool but it's well suited for presentations too. A new slide-show feature treats each drawing layer as a slide, and you can even create master slides. Because all the slides associated with a particular drawing use the same coordinate space, it's easy to create simple animations to demonstrate moving parts.

MacDraft can read PICT files and write to them, directly import MacDraw II documents, and read drawings and symbol libraries created with Dreams, IDD's discontinued high-end drawing tool. A built-in file converter transfers drawings between the Mac and Windows versions of MacDraft.

Compared to the competing low-end drafting packages, MacDraft comes up short in several areas. It lacks the DXF-conversion tool, extensive symbol libraries, and level of drawing precision offered by Generic CADD. Compared to Blueprint, MacDraft offers users a simpler interface and better dimensioning tools, but it is missing several important editing features, such as object scaling, arrays, and Boolean object operators.

The Bottom Line

With version 3.0, MacDraft takes its first serious step into the CAD arena. New ANSI-standard dimension tools are an important addition. And although MacDraft still lacks some features often found in traditional CAD programs, its solid performance and clean interface make it one of the easiest-to-use CAD tools you can buy.

— James K. Anders

SuperPaint 3.5

SuperPaint builds on its feature set and whittles its price.

The latest version of Aldus' veteran graphics program brings even more sophisticated and innovative tools to users on a budget. Like version 3.0, SuperPaint 3.5 provides two layers of tools that let you combine paint and draw elements in a single document. For a list price that's $50 less than the previous version's, the new SuperPaint adds full System 7 support as well as a variety of eye-catching draw and paint effects.

SuperPaint 3.5
Published by: Aldus Corp.
Consumer Division, 5120
Shoreham Place, San Diego, CA
92122; 619-558-6000.
List Price: $149.95.

Under Pressure

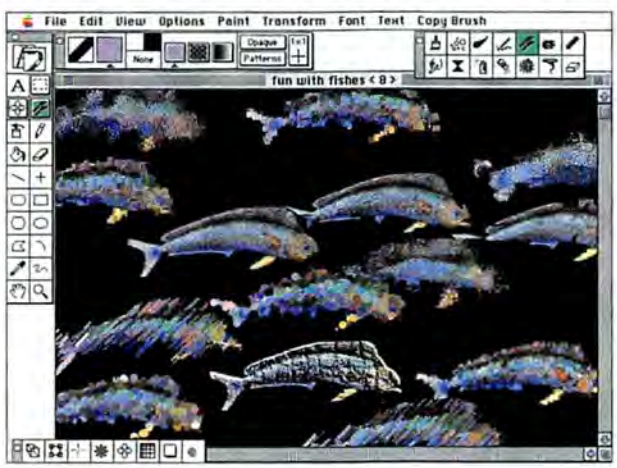
Version 3.5 adds support for pressure-sensitive graphics tablets, which work especially well with SuperPaint's calligraphy and texture brushes and twister and smudge tools. If you don't own a graphics tablet, not to worry — you can take advantage of these features by simulating pressure with mouse speed or keyboard equivalents.

Several of SuperPaint's showiest new effects stem from new plug-in tools, including the pressure-sensitive magic-marker and multisize-eraser tools. There's also a crop-mark tool, which lets you draw crop marks at all four corners of an image; a flowers tool, which creates a dizzying gallery of petal-like symmetrical patterns; and a grid tool, which draws evenly spaced or incrementally spaced perpendicular lines. Another special effect is the Mosaic plug-in, designed to whet your appetite for a collection of similar tools contained in the Aldus Gallery Effects packages.

SuperPaint's new copy-brush tool is a standout too. Similar to Photoshop's rubber-stamp cloning tool, the copy-brush tool lets you paint with a selected image or portion of an image. Using this tool, you can either make identical pixel-by-pixel copies of the original image or modify the image by applying special effects as you copy it — for example, simulating an artist's pencil-sketched version of your original or adding spatter, sponge, or confetti effects.

With version 3.5, you can import and place QuickTime movie frames (you need to have the QuickTime and Apple Photo Access extensions running). Having QuickTime installed also gives you access to Kodak Photo CD images at any supported resolution.

A plug-in that lets you scan images directly into SuperPaint rounds out the upgrade's import feature set. When this plug-in works, it's quite handy, but our system crashed several times when we attempted to scan an image, using the program's predefined memory setting of 2.5 megabytes. Boosting the setting to 3.5 megabytes solved the problem.



Among SuperPaint 3.5's new special-effects features is the copy-brush tool. You can duplicate a selected image either pixel-by-pixel or with the addition of a variety of special effects.

SuperPaint 3.5 ships with five templates, saved as stationery, that you can use to create fax cover sheets, memos, party invitations, trifold brochures, and thank-you cards.

SuperPaint's broad appeal has always been due in part to the program's modest hardware requirements. In keeping with that tradition, version 3.5 lets you print 24-bit-color documents to an ImageWriter II or ImageWriter LQ equipped with a color ribbon.

You can't take advantage of all the program's new color features unless your machine has at least 2.5 megabytes of RAM free *after* System 7 is loaded, however, and you need even more memory if you plan to use the scanning plug-in or if you intend to work with large, complex files.

SuperPaint 3.5 supports System 7's publish-and-subscribe, TrueType fonts, standard Apple events, and Balloon Help. Regrettably, Balloon Help is not available for the many tools and commands that arrive via plug-ins.

New tools and special effects aside, SuperPaint 3.5 continues to suffer from sluggish performance, particularly when it comes to opening and closing files and changing fills.

Still, the program's price can't be beat. Version 3.5 lists for $149.95. Owners of version 3.0 can upgrade to version 3.5 for $25 (upgrades from version 1.0 or 2.0 cost $45).

The Bottom Line

SuperPaint has never pretended to compete with the big guns in the draw and paint arena. Instead, it has quietly worked at providing an ever-expanding array of practical and easy-to-use tools to mainstream Mac users. Version 3.5 continues the tradition nicely.

— Dave Valiulis

OUTPUT DEVICES

Hewlett-Packard DesignJet 650C and CalComp DesignMate 3036M

HP and CalComp plot poster-sized output at affordable prices.

For most of us, a printer that produces tabloid-sized output suffices. But architects, engineers, and business presenters often require poster-sized and larger printouts. For those users, the good news is that plotters are getting faster and more affordable. The $11,690 Hewlett-Packard DesignJet 650C is a versatile inkjet plotter that produces excellent-quality business graphics as well as good-looking line drawings. The DesignJet can be shared on a network, making it an affordable workgroup option. The $3,295 CalComp DesignMate 3036M is a low-cost workhorse pen plotter tailored for architectural and engineering line drawings.

Hewlett-Packard DesignJet 650C
Manufactured by: Hewlett-Packard, P.O. Box 58059, Santa Clara, CA 95051; 800-851-1170 (in Canada, 800-387-3867) or 208-323-2551.
List Price: $11,690 (with 20 megabytes of RAM, PostScript Level 2, and HP JetDirect network card); $9,995 for base unit.

CalComp DesignMate 3036M
Manufactured by: CalComp, 2411 W. La Palma Avenue, Anaheim, CA 92801; 800-932-1212 or 714-821-2000.
List Price: $3,295.

HP DesignJet 650C

Think of the DesignJet 650C as big brother to HP's DeskJet 1200C/PS color inkjet printer. Each is a PostScript Level 2 output device, and each uses the same type of raster engine. The difference is that the DesignJet 650C comes with an accelerated pen carriage, which enables it to produce large-scale output quickly. The $11,690 configuration we tested comes with 20 megabytes of RAM and HP's EtherTalk JetDirect network card. Our test model handled A- through E-sized paper (E-sized paper is 36 x 44 inches).

The DesignJet's paper handling is flexible — the plotter handles both single-sheet and roll-feed paper. The roll-feed option makes printing with the DesignJet almost as easy as printing with a standard laser printer.

Networking the DesignJet is also simple. One MIO slot allows for connectivity to most networks, including LocalTalk, Ethernet, and token ring. The slot accommodates the same card that ships with the HP LaserJet 4Si MX, letting an entire enterprise communicate simultaneously with the plotter through EtherTalk, TCP/IP, or Novell's IPX.

The HP DesignJet 650C is so versatile you can use it to plot everything from architectural drawings to business presentations. Unlike traditional pen plotters, it uses a 300-dpi inkjet engine to print on A- to E-sized media.

The DesignJet's front panel has an LED display that shows when the plotter is receiving data. Settings on the display let you select options for I/O handling and printer language (HP-GL or PostScript, for example).

A PPD (PostScript Printer Description) file included with the DesignJet lets you control output sizes from within any application. You can scale artwork by as much as 400 percent, which means you can print a standard 8.5-x-11-inch drawing at E size without reformatting the document.

Because the DesignJet uses the same type of 300-dpi inkjet engine as the HP DeskJet 1200C/PS printer, it produces quality output that's on a par with that of its compact sibling. In addition, HP's special roll paper resists wrinkling, even when large areas of paper are covered with ink and colors are very saturated.

The DesignJet's printed lines are smooth, although they can't match the quality of those of a pen plotter, such as the CalComp model reviewed here. We were especially impressed with the quality of the DesignJet's vector-based charts and drawings. Even images printed from Photoshop were of good quality — a high-resolution scan printed at 72 dpi and sized at 22 x 30 inches looked great. Images that consisted of large areas of graduated or solid color did show slight banding.

The DesignJet is also fast, due to its i960 RISC processor and speedy pen carriage. A complex E-sized Adobe Illustrator 5.0 image took 13 minutes to print (at best quality) over an Ethernet network — a speed comparable with that of many of last year's inkjet color printers.

For line-drawing output, the DesignJet did better than expected

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New DMA/Asynchronous High Performance Disk Arrays Designed for the Quadra 840av

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for a raster plotter — thin lines were quite crisp. And because the plotter uses a standard four-color process, you can choose from a wide range of color combinations for lines and fills.

CalComp DesignMate 3036M

The CalComp DesignMate 3036M is a good buy if all you require is wire-frame drawings. It's not a good choice, however, if you're looking for a device that can also produce good-looking business graphics.

Although the DesignMate's features are predictable for a pen plotter, its price is not. At $3,295 for a model equipped with 1 megabyte of memory, the DesignMate is a bargain. You also need to purchase Microspot's $399 MacPlot Pen Plotter Professional driver software to get your Mac to communicate with the plotter. The MacPlot software provides a Chooser-level driver that converts the Mac's QuickDraw output to the DesignMate's native language.

CalComp's DesignMate 3036M is an affordable pen plotter that performs ably, but configuring it to work with a Mac can be frustrating and time-consuming.

Our chief complaint about the DesignMate is that it's a hassle to set up. The DesignMate ships from the factory ready to plot Autodesk AutoCAD drawings from a PC. Reconfiguring the device to work with Microspot's software is a tedious and antiquated process, to put it mildly. Because the DesignMate lacks an LED display, it prints configuration information on paper. You use two buttons located on the plotter mechanism to select the various options displayed on the printout. To connect the DesignMate to your Mac, you use a serial cable. Sharing the device on a network is not an option.

Once it's installed, the MacPlot driver provides additional options and settings. For example, you can substitute Geneva for the plotter's built-in line font. The driver also supports solid fills and TrueType fonts. These options exact a stiff price in speed, however — the plotter can take eight times as long to plot as it does with standard options selected. Also, plotting with these options at the highest-quality setting can cause clogging and smudging.

At standard settings, the DesignMate's output quality is very good. The plotter comes with an eight-pen turret that accepts three types of pens — liquid ink, liquid ball, and fiber tip. Each pen type produces a different line thickness. Four MaxPlot liquid-ball pens, designed to minimize clogging and skipping, ship with the plotter.

The DesignMate handles a variety of A- through E-sized media, including bond paper; translucent, polyester film; transparency film; and even vellum. Sorely missing is a roll-feed option — loading paper one sheet at a time can be cumbersome.

With a plotting speed of 42 inches per second for line drawings, the DesignMate is fast. Printing a sample mechanical schematic from Claris CAD took about six minutes, with the plotter's built-in line fonts.

The Bottom Line

The HP DesignJet 650C is not your usual plotter. It's a multitalented inkjet plotter that can handle a wide variety of large-format output, including line drawings, posters, and business presentations. With PostScript Level 2 power, fast printing, quality output, and network support, the HP plotter is an outstanding buy.

For CAD-specific output, including structural designs, wire-frame drawings, and schematics, CalComp's DesignMate 3036M is an affordable and solid plotting device. Configuring it can be frustrating, but once you have it up and running, the DesignMate performs quickly and ably.

— Sean Safreed

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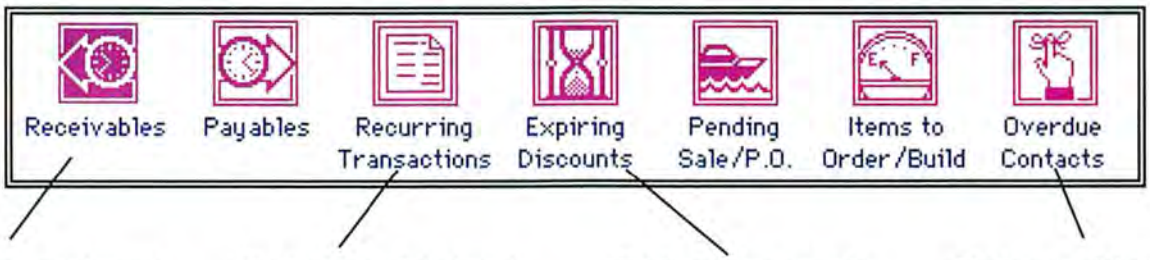

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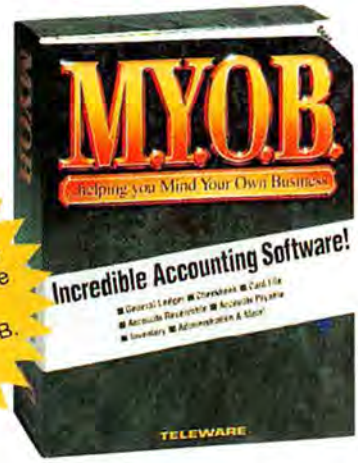

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Requires Macintosh Plus or better, 2MB RAM or better, a hard drive with approximately 2MB of free space. System 6.0 or later with the font Geneva 10 installed. An Apple ImageWriter or LaserWriter printer is optional. An Apple (or compatible) modem is optional. M.Y.O.B. is a trademark of Teleware, Inc. All other products mentioned are trademarks of their respective companies.

CAD

AutoCAD Release 12 for the Macintosh

The new AutoCAD looks and drives like a real Mac application.

With AutoCAD Release 12 for the Macintosh, Autodesk's ubiquitous CAD program sheds its dual personality and becomes a full-fledged Mac application. Unlike last year's Release 11, which presented users with a confusing mix of Mac and character-based DOS interface elements, Release 12 boasts a highly graphical interface with a new Tool palette and more- conventional Mac dialog boxes. Release 12 also provides significant speed improvements, greatly enhanced tools for 3-D solid modeling and rendering, full Clipboard support, and the addition of FileMaker Pro to AutoCAD's list of supported external database programs.

AutoCAD Release 12 for the Macintosh
Published by: Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965; 415-332-2344.
List Price: $3,750; AME solid modeler, $495.

GUI Good Looks

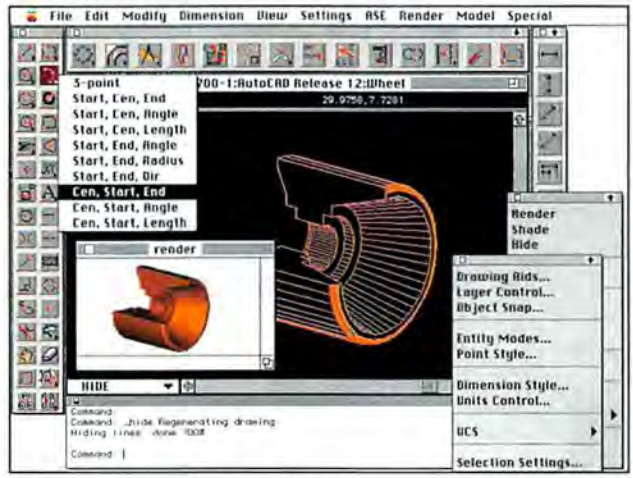
AutoCAD Release 12 for the Macintosh is much easier to learn and use than previous versions. For starters, you can access most commonly used commands for drawing and editing from the two-row vertical Tool palette. The palette also contains icons representing object-snap modes (center, endpoint, intersection, and tangent) as well as zoom, move, scale, copy, rotate, and mirror tools.

AutoCAD's new interface is flexible and customizable. You can orient the program's handy tear-off menus horizontally or vertically and move them anywhere on-screen. The menus let you control dimensioning operations and geometric modifications such as arrays, offsets, chamfers/fillets, and trimming.

Another useful new interface element is the Command History pop-up menu, which can store as many as ten commands from the current drawing session. You can select and execute any command from the menu.

Mac users will also feel right at home with Release 12's Macintosh-style dialog boxes. Complete with Help buttons that detail the task at hand, the dialog boxes draw to the screen much faster than their DOS-like predecessors.

Although Release 12 features a new look, AutoCAD's trademark character-based Command window — used for prompts and numeric entry — is still present. The window contains a transcript of the current drawing session. You can resize and position the window anywhere on-screen as well as dock it to the main drawing window. If you work with a dual-screen display, you can move the Command window to the second display, and if you need a larger work area, you have the option of hiding the window altogether.



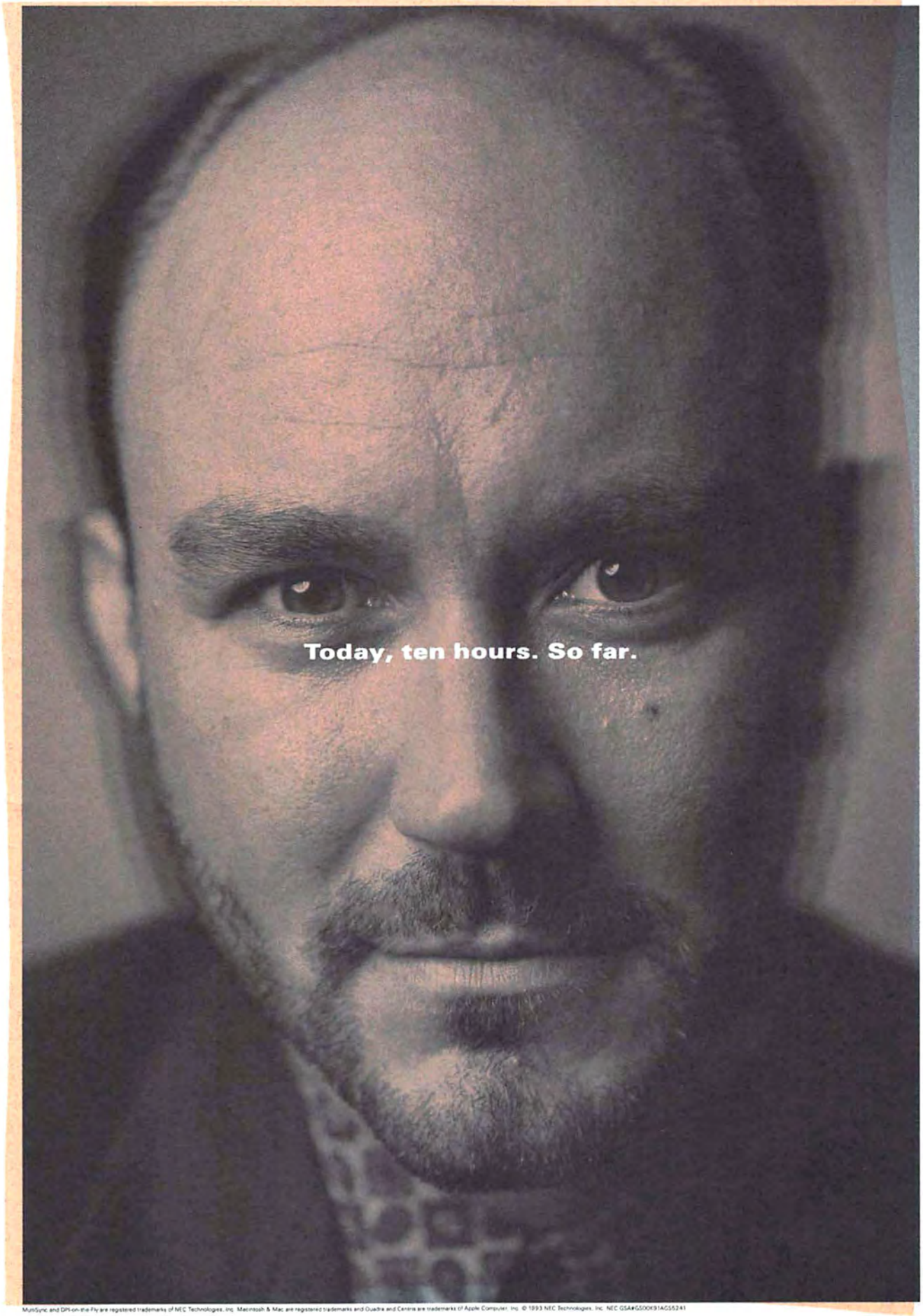
AutoCAD Release 12 for the Macintosh features a new look that's sure to win points with Mac CAD users. New are the Tool palette, tear-off menus, and the Command History pop-up menu.

Almost as welcome as AutoCAD's new interface is its increased speed. We compared the speed of the new Mac version running on a Quadra 700 with that of AutoCAD for Windows running on a Compaq DeskPro 486/33M. For most drawing and display operations, our informal tests showed that speed was roughly on a par for both platforms.

Like its predecessor, Release 12 provides sophisticated tools for building custom CAD applications. In addition to writing compiled AutoCAD Development System (ADS) applications with the Apple Macintosh Programmer's Workshop, developers can write interpreted AutoLISP programs and AutoCAD scripts. Custom ADS applications run much faster on the Mac under Release 12 than under the previous version, boasting a tenfold increase in speed over applications running under Release 11 for the Macintosh and more than a two-fold increase over applications running under AutoCAD for Windows.

The AutoLISP programs and scripts you create can be shared by all AutoCAD platforms (Macs, PCs, and UNIX workstations). Overall, with AutoCAD's binary-compatible file formats, Autodesk continues to provide unparalleled cross-platform support among DOS, Windows, and UNIX versions of AutoCAD.

The file-exchange capabilities of AutoCAD are enhanced with Release 12 too. In addition to the program's standard DXF and IGES options, the new release imports and exports EPS files. It also makes proper use of the Clipboard, which now handles cut, copy, and paste operations reliably. You can use the Clipboard to import and export PICT files, although PICT imports seem to work the best when they are made up of ungrouped



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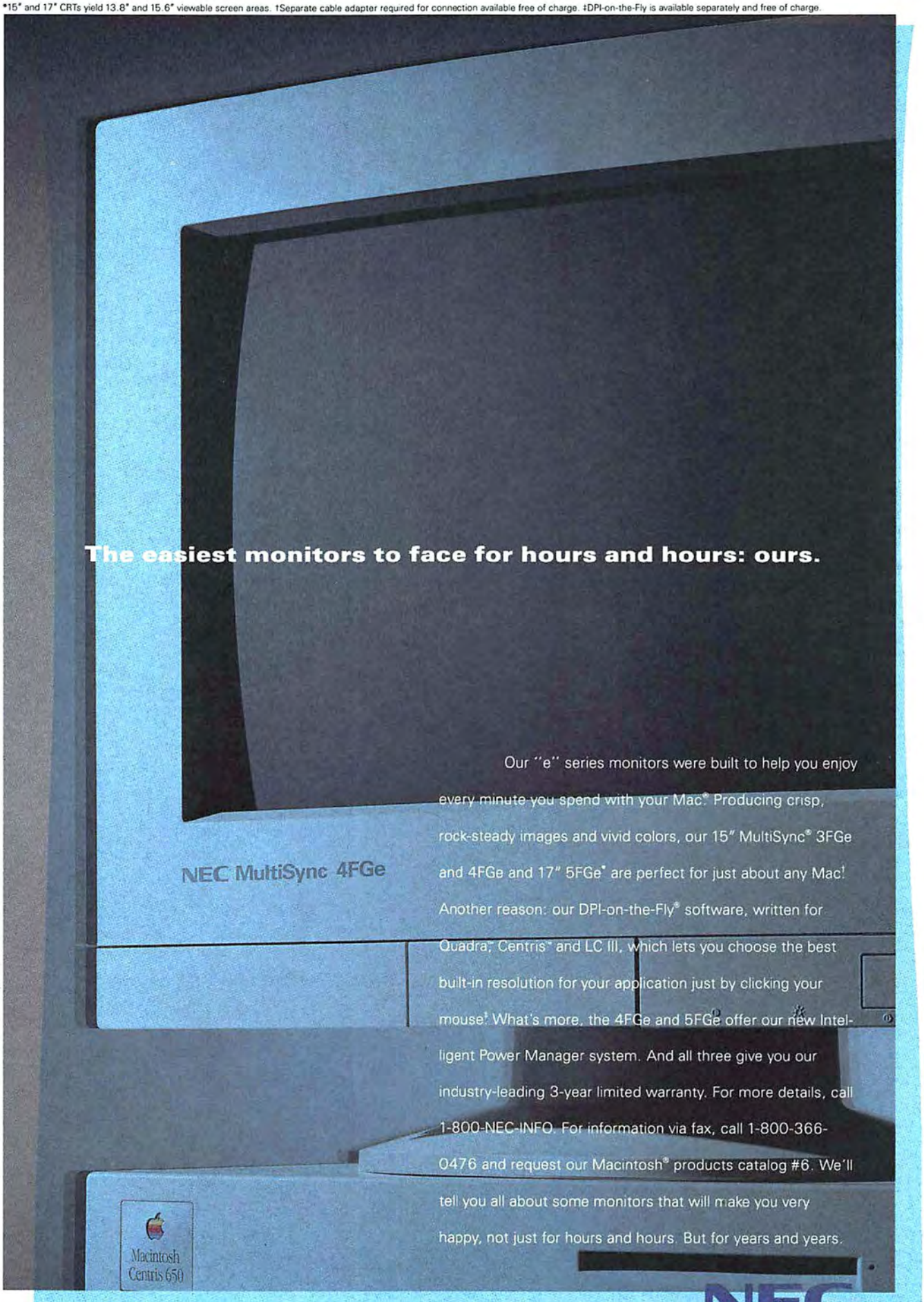

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geometries that don't include text.

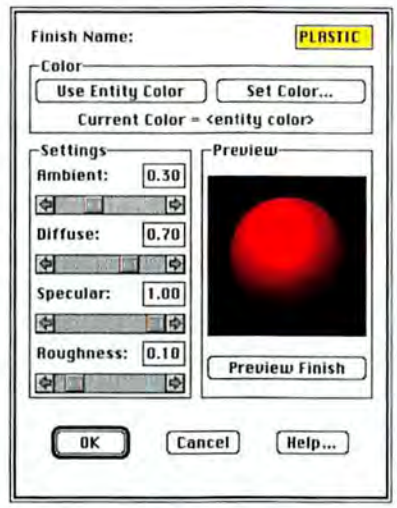
For those who need to generate bills of materials and other types of reports by using data from drawings, AutoCAD has long provided links with external database programs, including dBASE and Oracle. Release 12 extends the program's support to the Mac's most popular database program, Claris' FileMaker Pro.

AutoCAD's solid modeler, the optional Advanced Modeling Extension (AME), continues to be a mechanical engineer's delight. The version for Release 12 offers improved precision and an Interference command, which highlights solids that overlap.

Although AutoCAD's 3-D interface remains fairly unintuitive, forcing users to set views manually, the AME solid modeler and AutoCAD's standard surface commands benefit from Release 12's enhanced rendering capabilities. The program can now produce smooth, shaded surface images in a variety of formats, including TIFF, GIF, and PICT. You can define multiple light sources; degree of roughness; and ambient, diffuse, and specular reflections. The renderer lacks support for shadows, though, as well as for translucent, transparent, and textured materials. If you require true photo-realistic images, you'll probably want to export your models to a full-fledged rendering program.

Release 12's interface makes the program more accessible to Mac users than previous versions, but AutoCAD remains complex and requires time to learn and master. Compared with rival programs, however, it offers a range and breadth of features no other CAD program can match. Intergraph's MicroStation Mac is AutoCAD's closest competitor for high-end features, but it uses a Motif X Window-style interface and lacks any solid-modeling capabilities. MicroStation Mac is also copy-protected through hardware with an ADB dongle. Although some architects may benefit from MicroStation's rendering and walk-through features, most engineers will choose to use AutoCAD's solid modeler. Ashlar Vellum 3D boasts an innovative user interface, but it lacks AutoCAD's programmability as well as its surface- and solid-modeling features.

With AutoCAD Release 12, Autodesk has made great strides toward meeting Mac users' needs. There's still room for improvement, however. Conspicuously missing are support for PostScript and



Mac-standard dialog boxes are a big improvement in AutoCAD Release 12 for the Macintosh.

TrueType fonts, the ability to have multiple documents open at the same time, support for multiple concurrent networking protocols (such as MacIPX and MacTCP in addition to AppleTalk), and more-intuitive tools for building 3-D models.

Release 12 requires a Mac equipped with at least a 68020 processor, a 1.4-megabyte high-density floppy-disk drive, a math coprocessor, and a minimum of 8 megabytes of RAM (we recommend a Quadra with a fast hard drive). You need 30 megabytes of hard-disk space and a color or monochrome monitor that supports a minimum resolution of 640 x 480 pixels, and you must be running System 7.1 with 32-bit addressing enabled.

The AutoCAD documentation is comprehensive and exhaustive. It includes a complete reference guide, programming manuals, a tutorial, a user's guide, and a Mac-specific installation guide.

The Bottom Line

At long last, the Mac CAD community can feel at home with the industry-standard CAD program. AutoCAD Release 12 for the Macintosh features a new graphical interface that not only looks and feels familiar to Mac users but also makes the program easier to learn and use. In addition, speed improvements in Release 12 allow the Mac to compete more effectively than ever with Intel-chip-based machines as the platform of choice for drafting and design.

— James K. Anders

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DRAWING

Canvas 3.5

Deneba adds icing to the cake with new special effects for Canvas.

The latest release of Deneba's jack-of-all-trades draw program is solid and even more versatile than the previous version. Noteworthy among Canvas 3.5's 20 enhancements are new text and special-effects tools. But perhaps the biggest news is that the latest release coincides with the introduction of the first Windows version of Canvas — good news for illustrators working in mixed Mac and PC environments.

Canvas 3.5
Published by: Deneba Software, 7400 S.W. 87th Avenue, Miami, FL 33173; 305-596-5644.
List Price: $399.

New Tool Loader

Like the previous version, Canvas 3.5 handles many of its tools as externals rather than including them with the core program. That means you can speed the program's execution and streamline its interface by loading only those externals you need for a given work session. Version 3.5 gives you more-flexible access to external tools with the new Tool Loader, which lets you activate *any* external tool, even those you didn't load when you first launched the program. The previous version forced you to quit and relaunch Canvas if you needed a tool that wasn't already loaded.

Canvas still boasts a solid collection of tools for formatting type and adding dimensions and labels to drawings. Version 3.5 adds the ability to flow text from one column to another, bind text more accurately to irregular shapes, and apply finer kerning controls. You can also save your text formats as style sets, which work much like word-processing style sheets. New text features make Canvas even more proficient at handling page layouts that combine text and graphics.

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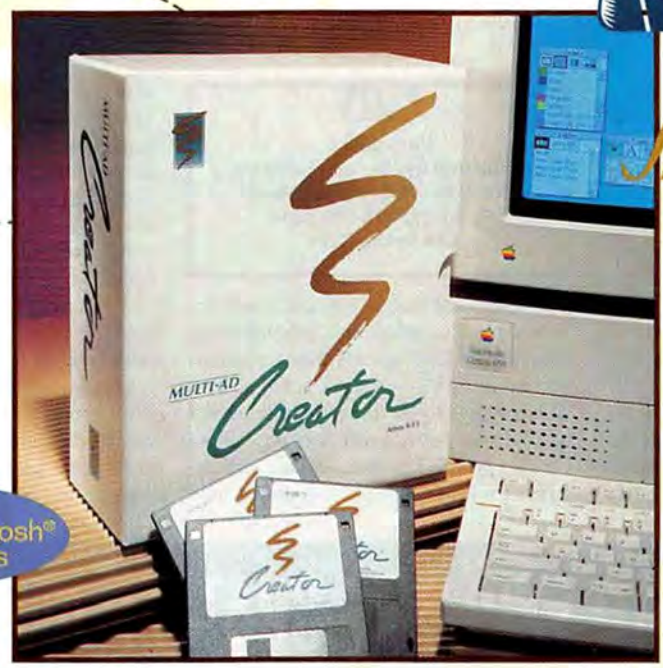

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—MacWEEK

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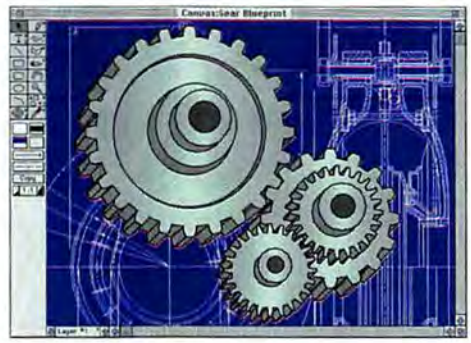
Multi-Ad Creator is a product of Multi-Ad Services, Inc. 1720 W. Detweiller Dr. Peoria, IL 61615 309-692-1530



Canvas 3.5's envelope tool lets you stretch and squeeze objects and text (left). The new extrude tool lets you simulate 3-D effects (right).

The Envelope, Please

Canvas boasts a slew of special-effects externals, including several new additions. The envelope tool lets you stretch and squeeze object and text selections by dragging control handles. With the extrude tool, you are able to simulate 3-D effects by creating a duplicate of an object and then connecting it to the original with perspective lines. This feature works best on simple shapes such as polygons and stars. It is also useful for creating shadowed text.

The new fractal external tool transforms straight lines and smooth curves into random squiggles. Additional externals create concentric circles and perfect spirals.

Version 3.5 also adds support for pressure-sensitive drawing tablets. With the pressure-pen external tool, you can vary the thickness of the lines you draw by altering the degree of pressure you apply to the tablet with your stylus.

Get Smart

Another welcome addition is Smart Lines, which is a feature for linking objects that maintains your links even when you make modifications to the objects. This capability comes in especially handy when you need to modify organization charts, electronic-circuit diagrams, or any drawing that contains labels and label lines.

With the introduction of Canvas for Windows, people who work in mixed

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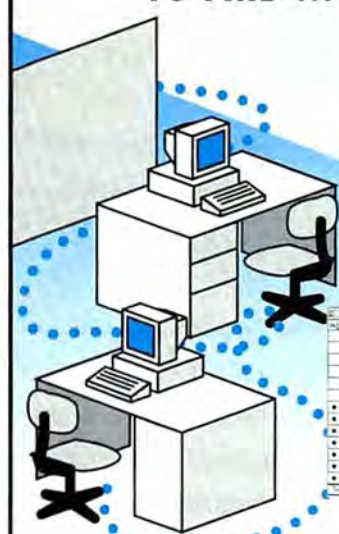

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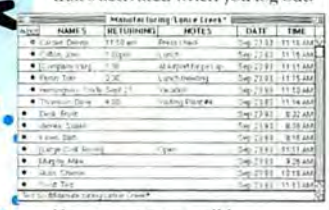

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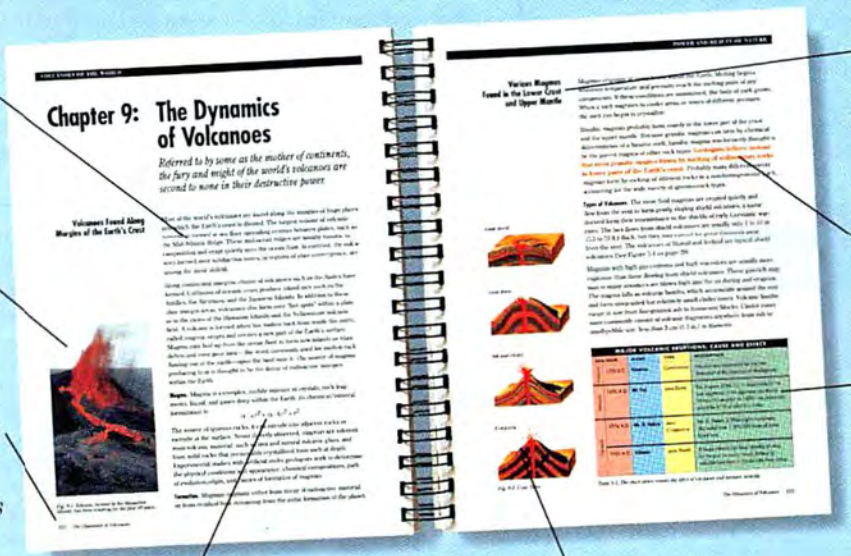

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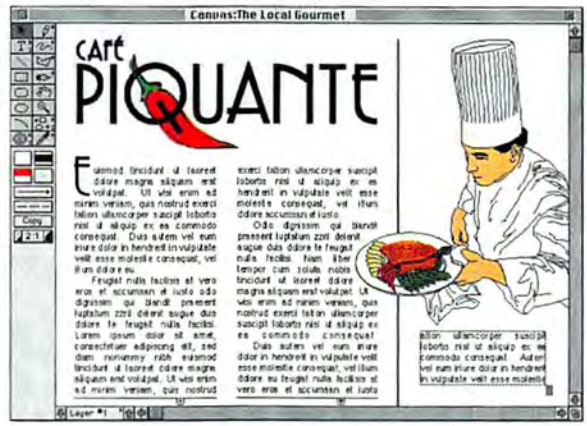
CIRCLE 66 ON READER SERVICE CARD.

Mac and PC environments are able to take advantage of full file compatibility between the Macintosh and Windows versions.

Overload

Our one complaint about Canvas has to do with its somewhat complicated interface. The program is so loaded with tools that it's sometimes difficult to access the functions you want. Version 3.5 adds even more features to an already crowded interface. For example, we counted 11 Preferences dialog boxes, 22 Managers (when all extensions are loaded), and a minimum of 9 floating palettes.

Many of Canvas' external tools were innovative when they were first introduced, and they make the program a veritable powerhouse of precision design. Canvas is not an easy program to learn and use, however. A little consolidation of its features would certainly go a long way toward simplifying the user interface.



Those who use Canvas for page layout will welcome a new feature that allows text flow from one column to another.

The Bottom Line

It's been two years since the last major upgrade of Canvas. Current users will welcome version 3.5's text capabilities and eye-catching special effects. And those considering Canvas as their first drawing program won't find a wider variety of powerful tools for the price ($399). But new buyers, be forewarned that the flip side of Canvas' blockbuster collection of tools is an interface that requires time and patience to learn.

For designers and illustrators working in mixed-platform environments, the new Canvas for Windows should make exchanging drawings and collaborating on illustration projects a breeze.

— *Clay Andres*

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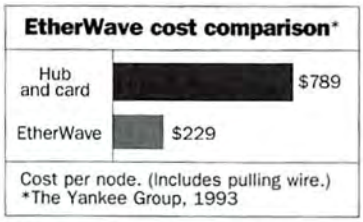

You need to add a node. And fast. But there's not a port available. That's why EtherWave products contain two self-terminating RJ-45 ports. So you can "daisy-chain" Macs, PCs, PowerBooks and printers from a single hub port or wall jack. Saving you the hassle—and tremendous expense—of pulling more cable.

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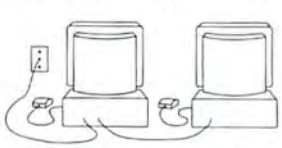

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CENTRAL POINT

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QUICK CLICKS

CopyDoubler

Sometimes all it takes to impress a jaded software reviewer is a smart utility that does one or two simple things extremely well. Case in point: CopyDoubler 2.0.1, from Fifth Generation Systems.

CopyDoubler has one main function: to copy and delete files faster than the System 7 Finder can do it. In our tests, CopyDoubler succeeded admirably at this goal, consistently performing at about twice the pace of the Finder. Other shareware and commercial programs perform similar feats, but none do it as simply or as transparently as CopyDoubler. No applications to launch, no need to patch any code in the System or Finder files — just drop the CopyDoubler control panel into the System Folder, and restart. The next time you try to copy or delete a file from the Finder, CopyDoubler will intercept the call. CopyDoubler can work in the background and even lets you select further copy jobs while one is still in progress.

If you try to replace a file-filled folder with an identically named folder from another disk, you meet CopyDoubler's most outstanding feature: Fast Replace. With this option, CopyDoubler saves time by copying only those files that differ from the versions already on the destination disk. This feature, along with CopyDoubler's ability to defer a copy request, lets you use CopyDoubler as a no-frills incremental-backup utility.

Our only problem with CopyDoubler was its somewhat erratic behavior during whole-disk copying (the dragging of one floppy disk's icon over another to copy files from disk to disk). When you do this in the Finder, all the files on the destination disk are deleted before the new files are copied onto it. In contrast, CopyDoubler sometimes added the new files to the ones already there. Other times, the utility deleted only some of the destination-disk files. Once, it refused to copy at all. Although version 2.0.1 is better at making whole-disk copies than version 2.0 (which had a bug that could cause files on your hard disk to be erased during this operation), you may want to wait for the next incremental release, which Fifth Generation says will fix the bugs in whole-disk copying.

Apple may someday improve the Finder's speed, but don't hold your breath waiting. In the meantime, using CopyDoubler is a great way to give your Finder a much-needed boost.

Fifth Generation Systems, Inc., 10049 N. Reiger Road, Baton Rouge, LA 70809; 504-291-7221. Version 2.0.1. $44.96.

— Ted Landau

PowerCD

Apple's PowerCD is one of those products we wish we could like better. It's a compact, snazzy-looking CD-ROM drive that can do many things: read CD-ROMs, play audio CDs, run on batteries, access multisession Photo CD data, and even connect to a TV set so you can view those Photo CD images in the comfort of your living room — making complete use of the PowerCD's megabutton remote control, of course (for zooming in and out or rotating and cropping images, for example).

But you soon find out that the sleek and curvy PowerCD is designed more for looks than for ease of use. The way the front panel opens makes it difficult to take discs out without getting your fingers all over them. And there's only one SCSI connector, so the PowerCD has to be the last device on a SCSI chain — an extremely awkward situation if you have an internally terminated device or another peripheral that must also be last on the chain. Plus, if you take it on the road (at 3.1 pounds, it's no Sony Discman but it's lighter than other CD-ROM drives), you'll find that the batteries last only an hour or two for data use.

The speed at which CD-ROMs play on the PowerCD, a single-speed drive, is also a disappointment, given that comparably priced double-speed drives are now widely available (with triple- and quadruple-speed drives also starting to appear). Although the PowerCD doesn't lag terribly on all CD-ROM titles, titles with data that you access randomly can be frustratingly slow. For example, searching for paintings by the artist Corot on ImageAccess' The Fricke Collection took 1 minute and 22 seconds on the PowerCD, compared to about half that time (44 seconds) on the double-speed AppleCD 300 — and street prices for the AppleCD 300 were generally $20 to $30 *less* than those for the PowerCD at press time.

Basically, the PowerCD fits in the "jack of all trades, master of none" category — or perhaps "master of one." It provides high-quality display of Photo CD images on your TV, although not with great speed. For playing audio CDs, however, it's neither as portable as a Discman nor as easy to use as a standard audio-CD player. And its relative slowness makes it a poor choice for anyone who wants to start investing seriously in CD-ROMs.

If you must have one device that does everything the PowerCD does, go ahead and buy it — it'll look great next to your computer or TV and impress your gadget-fiend friends. But if you want a CD-ROM drive that won't be inconvenient and slow, you're better off fighting the PowerCD urge.

Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010. $499.

— Cheryl England

Glider

Glider is a deceptively simple arcade game that pits you, as the pilot of a paper airplane, against a houseful of surprises. Your goal is to fly your plane across each room, from left to right, without crashing into furniture or encountering other hazards such as tables, balloons, helicopters, electrical outlets, and candles. Your glider has no engines, of course, so it will drift to the ground after a few seconds unless you maneuver it near the heater vents in the floors. Because warm air rises, these vents lift your glider toward the ceiling (hint: wiggling — by tapping the right and left keys in rapid succession — is key to mastering rising and falling motions). But be careful: Many rooms also have vents in the ceiling that suck in your glider when you fly too close . . . .

You can control your glider with the mouse, a joystick, or the keyboard. Although the game's manual implies otherwise, the user-definable keyboard controls — backward and forward (left and right) — seemed the most accurate to us.

You have two other potential helpers: energizers and rubber bands. To get energized, you must capture one of the batteries scattered throughout the house

and press the user-defined Energize key; your glider shoots forward as if turbocharged. The rubber bands are for shooting at enemies, but again, you have to find and capture some before you can use them.

Once you've mastered flying through the included rooms, you can use the full-featured Room Editor to build your own, with plans as simple or as fiendishly difficult as you like. You can also move on to play with More Glider, an add-on set from Casady & Greene that includes six devious new houses with hundreds of rooms.

My criterion for a great arcade game — minutes to learn, months to master — describes Glider to a T. You'll be up and running within minutes of installing it, but you won't become proficient for a long while.

Casady & Greene, Inc., 22734 Portola Drive, Salinas, CA 93908; 800-359-4920 or 408-484-9228. Version 4.06. $49.95; More Glider, $19.95.

— *Bob LeVitus*

DriveShare

★★★½

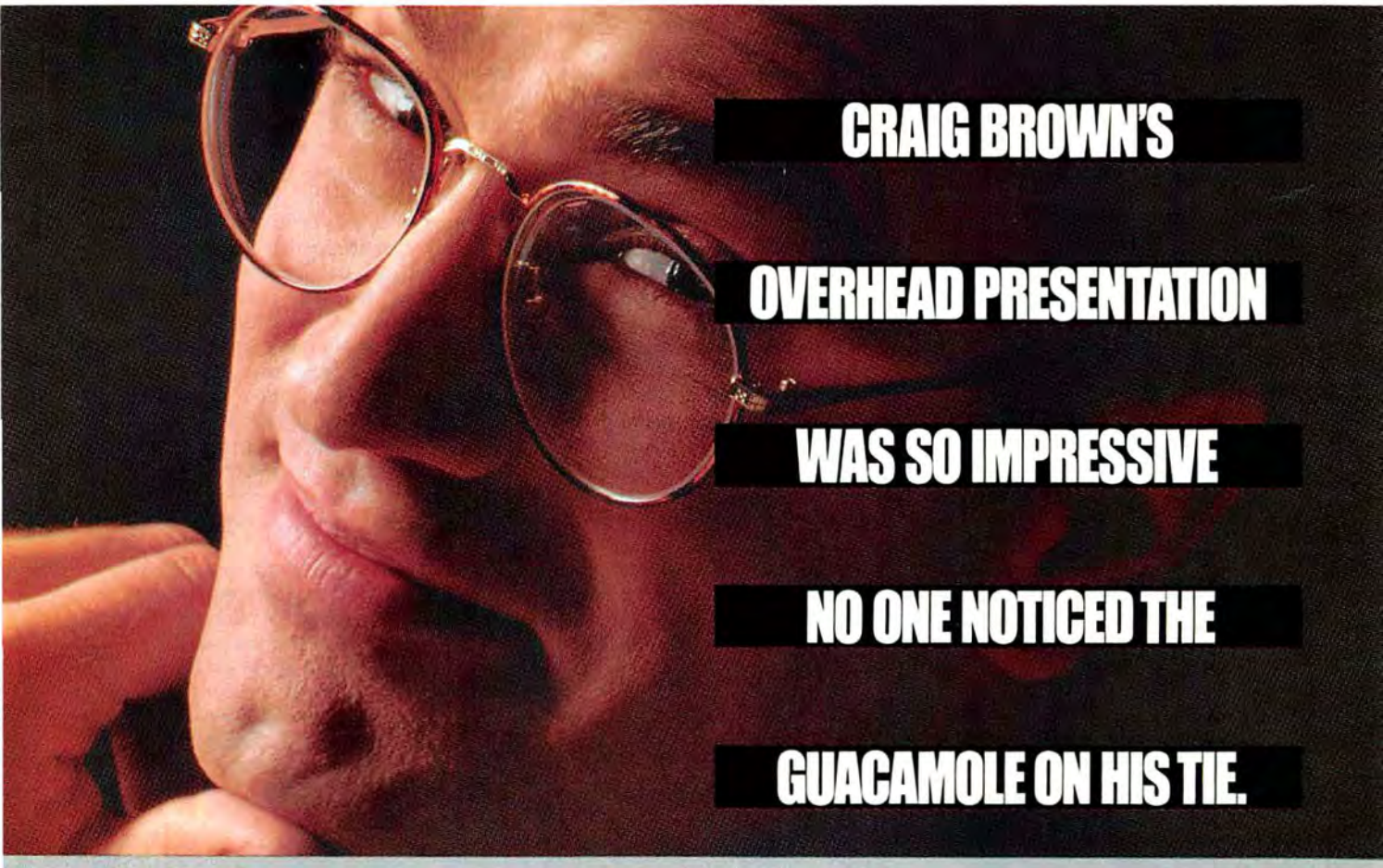
DriveShare is a control panel that overcomes the quirks of sharing SyQuest, Bernoulli, CD-ROM, and magneto-optical drives over a network.

Standard System 7 file sharing requires that removable media be mounted at startup if they're to be shared, and it doesn't let you unmount them until you turn it off. DriveShare overcomes these problems. It overrides System 7 file sharing with an independent protocol that keeps file sharing active at all times (unlike the freeware product UnmountIt, which toggles file sharing on and off when you're unmounting a removable medium). DriveShare includes a universal driver, in the form of a control panel called Drive7rem, that lets it communicate with removable-media drives of all types.

Once you've installed DriveShare on the server connected to the removable-media device and on the client machines that access the device (Drive7rem goes on the server only), you can use the software on the server to control the zones in which the device is made available and the clients allowed to access the device. The server can mount removable media on a client's desktop, eliminating the client's need for a password.

Although DriveShare can work without System 7 file sharing, you'll find instances in which you need both DriveShare's and System 7's protocols. For example, DriveShare is not designed to work with hard drives. If a server is set up to share both removable-media and hard drives, both protocols must be in place. Also, DriveShare can share a device with only one client at a time, and it must share the entire contents of the mounted medium (not just one folder); to avoid either of these difficulties, you need both protocols.

We'd like to see DriveShare accommodate multiple simultaneous clients and share media subsets; such improvements



would provide additional value over its freeware competition. Still, DriveShare provides an easy and convenient way to bypass System 7's frustrating limitations on sharing removable drives.

Casa Blanca Works, Inc., 148 Bon Air Center, Greenbrae, CA 94904; 415-461-2227. Version 1.0.2. 5-user pack, $129.95; 10-user pack, $199.95.

— Roman Victor Loyola

CoActive Connectors

★★★½

Networking Macs and PCs in a small-office environment isn't as hard as it used to be, thanks to products such as the CoActive Connectors, from CoActive Computing. These connectors, like Farallon's PhoneNet products, let you use standard phone wire to create a daisy-chained LocalTalk network of Macs, PCs, and printers. The Mac version, like other LocalTalk connectors, attaches to the printer port. The PC connector has two RJ-11 ports and attaches to a PC's parallel port. All connectors are self-terminating, and the PC products include an AC adapter to power the built-in Motorola 68000 processor.

CoActive's DOS or Windows software, which lets you configure PCs for printer sharing and file sharing under AppleTalk, is easy to install. If you have a parallel printer connected to a PC, you can share it over the network by cabling it to the parallel pass-through port on the CoActive connector.

File exchange is another useful capability of these connectors. You can mount PC or Mac volumes on a PC just as you do on a Mac with Apple's file sharing — almost. CoActive's software creates one shared directory (which can contain as many as 100 files) on each PC. Everyone on the network has guest access to the directory — it's not protected by password security. Within the shared directory, the CoActive software creates a private folder that others on the network can copy to but not view or change.

On the Mac side, Apple file sharing lets you grant and limit folder access by PC users in the standard way. Under System 6, you can't share Mac folders but you can mount PC volumes if the AppleShare client software is installed on the Mac.

The greatest assets of CoActive's product are its ease of installation and its affordability. You won't need a network administrator or a PC expert to get the system up and running. CoActive connectors are great for small offices and home networks, but they face a daunting challenge from Farallon's new EtherWave products, which provide plug-and-play Ethernet (rather than the slower LocalTalk connectivity that CoActive connectors provide) for those same small networks at a slightly higher price.

CoActive Computer Corp., 1301 Shoreway Road, Suite 221, Belmont, CA 94402; 415-802-1080. Mac connector, $39; DOS or Windows connector, $160.

— Shelly Brisbin

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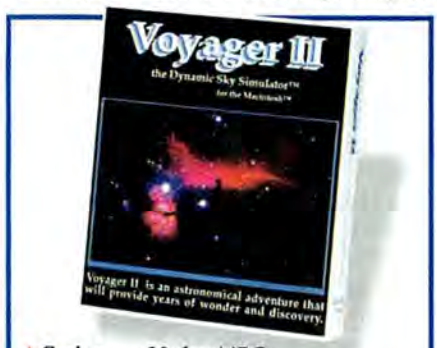

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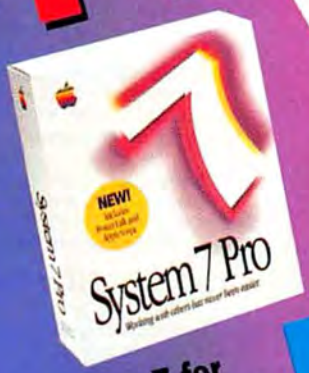

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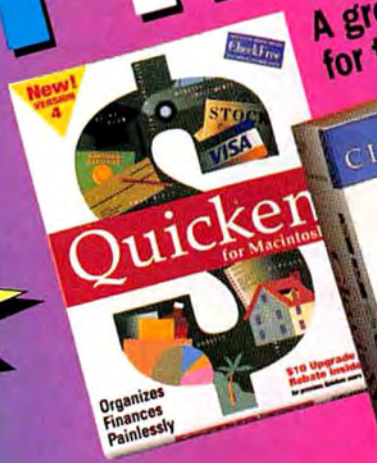

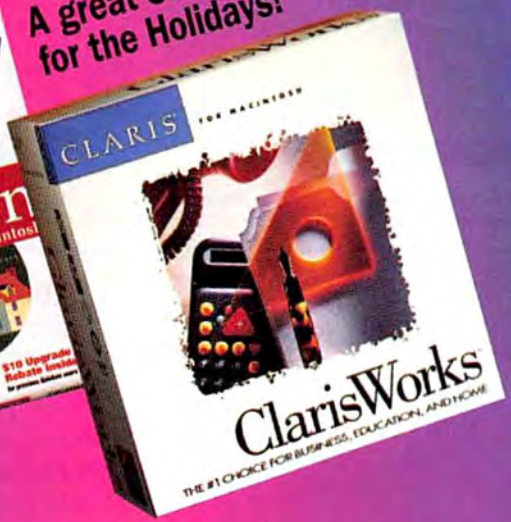

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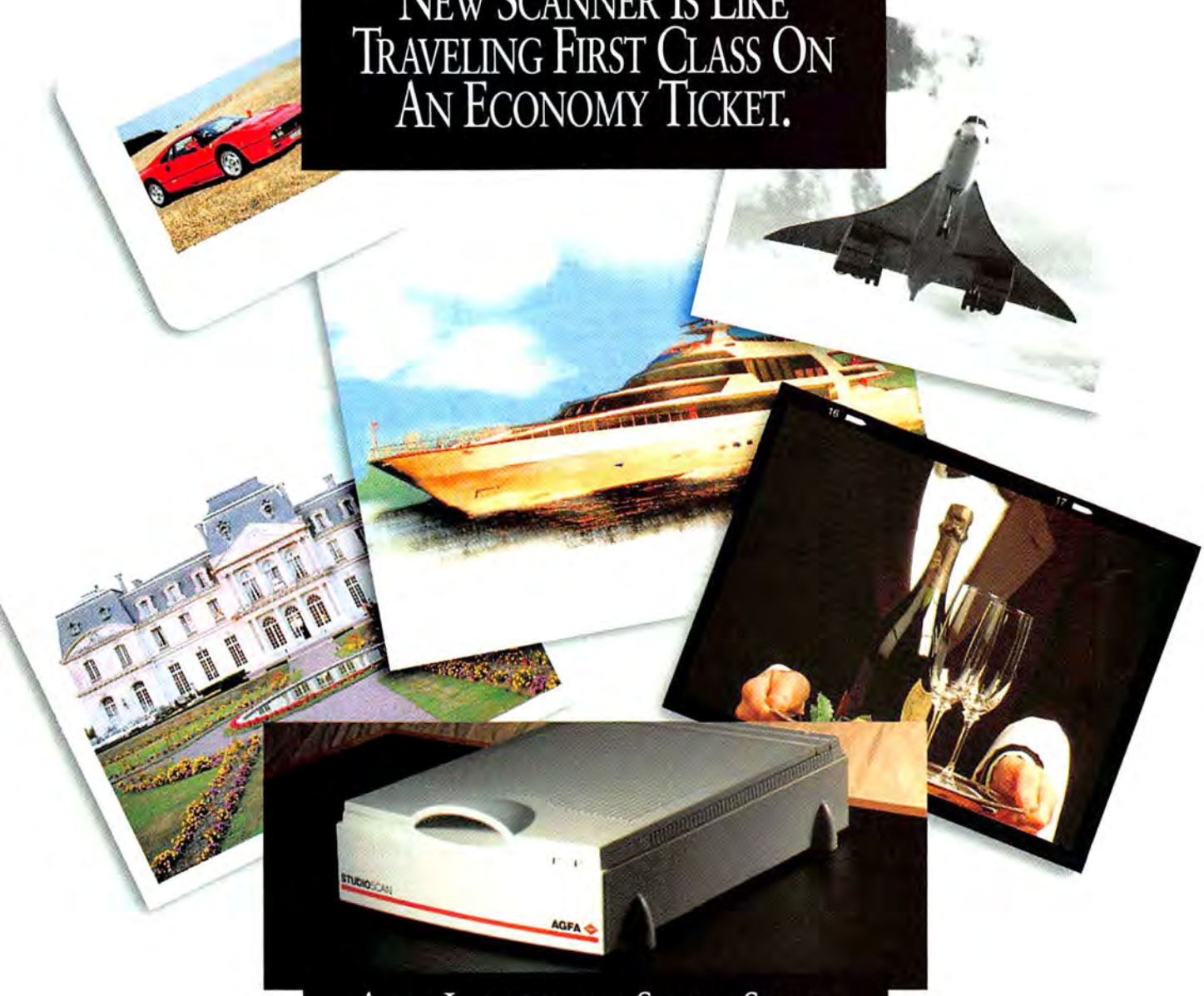

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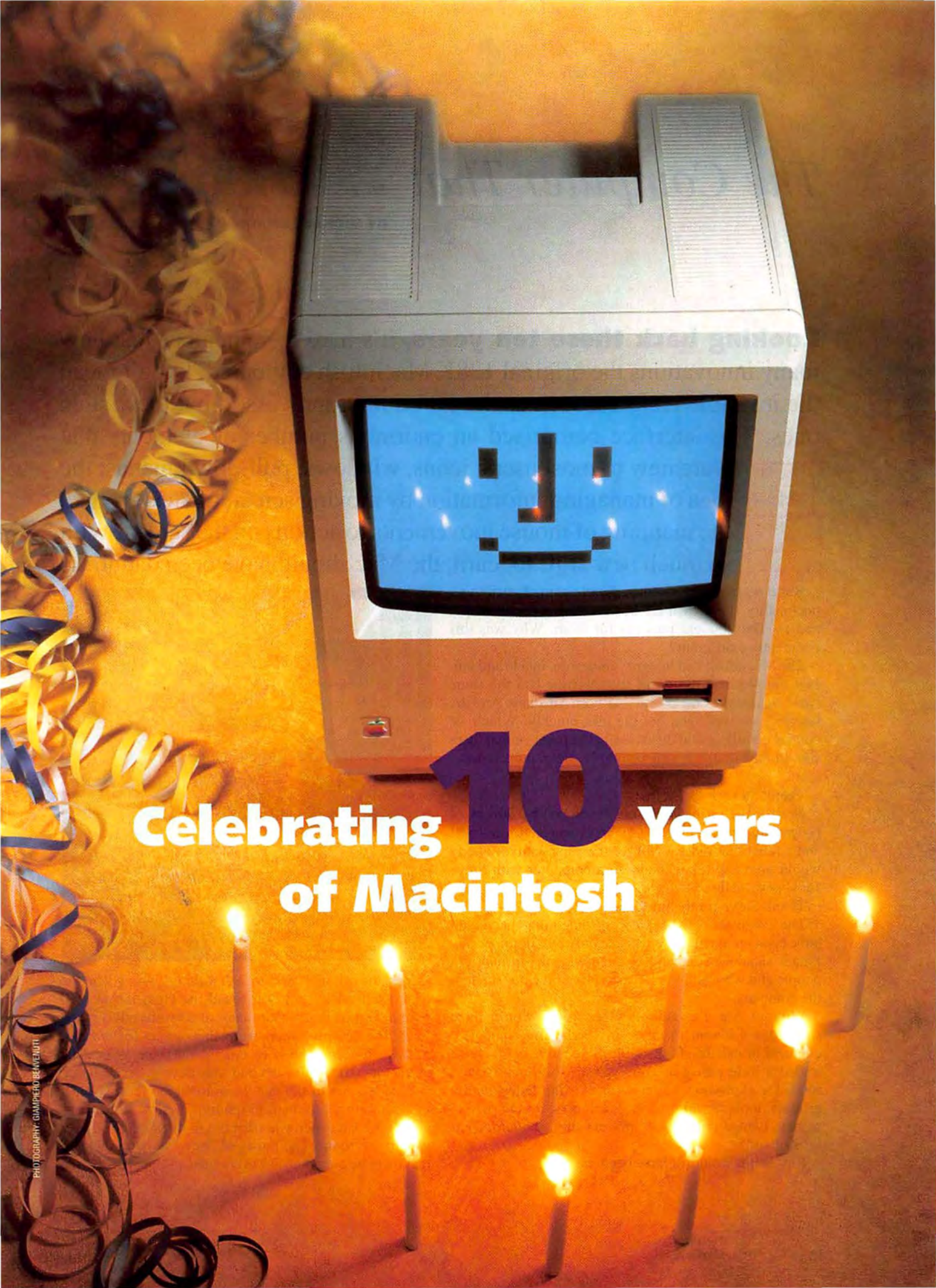
Celebrating 10 Years
of Macintosh
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The Computer That **Smiled**

BY MICHAEL SWAINE

Looking back these ten years, it's hard to remember just how many innovations the original 128K Macintosh embodied. I don't mean the invisible features, such as the 16-bit microprocessor, but the visible ones. The interface comprised an enormous number of elements that were new to most users: icons, windows, pull-down menus, the idea of managing information by moving screen images around, the mapping of mouse movements to actions on the screen. With so much new stuff to learn, the Mac should have been daunting.

But it wasn't. Before long, people started attributing personality traits to their Macs. They gave them pet names. They bought presents for them. Why was this computer so different?

The Macintosh had integrity of design, inside and out. Just the physical design of the machine had the same basic *rightness* as the classic '65 Ford Mustang. And the interface — well, you got the idea quickly. Which, of course, entails — and this is really the point — that there was an idea to *get*. A single, simple, clear, pure vision.

Thank Steve Jobs for that.

Not for the vision; that was developed by dozens of programmers and engineers at Apple and Xerox and SRI and a few other places. Not for the personality; nobody would give a cute nickname to a computer with Steve Jobs' personality.

Thank Steve for the integrity.

The original 128K Mac was something that could have been hounded into existence only by a domineering fanatic capable of demanding intense loyalty from bright people and who held the largest voting block of stock in the company.

Without Steve's commitment, Apple would have shipped a different machine in 1984. Any competent engineer or half-bright marketing executive would have traded a little purity of concept for a bigger box with room for expansion, support for existing letter-quality printers, tools for third-party developers, decent performance, compatibility with any existing standard. That kind of stuff.

But then it wouldn't have been the Mac.

DIANA WALKER-TIME MAGAZINE

Yes, the original Mac got a few things wrong. But the Mac itself made such sense and the elements worked together so naturally that many of us were utterly won over. The next two years were challenging for those of us who felt compelled to defend the Mac against its detractors (IBM PC users and Mac developers).

Which is not to say that we ignored the flaws. Some, in fact, were pretty hard to ignore. There was the disk-swap tango, a dance you tried not to do when a PC user was in the room. The purity of Steve's vision dictated that there be only one disk drive (and a floppy-disk drive

at that) and that available RAM be a small fraction of floppy-disk capacity. The consequence of these decisions was that to copy a disk, you had to keep sticking disks in and popping them out until your wrist began to tremble. It was a more serious deterrent to unauthorized disk copying than any license agreement ever written.

Well, we made do. One developer noticed an extra 200K of memory was dedicated just to refreshing the screen and wrote a disk-copy program that used this memory as temporary storage during copying. It worked, albeit disconcertingly. The screen circuitry dutifully read these bits of data from the floppy and displayed them as pixels, giving a good imitation of a TV set tuned to a nonexistent channel.

Some of us just bought a second floppy drive.

Clearly, the Mac had some growing up to do, and the sooner, the better. And soon, it got better. Apple brought out the 512K "Fat Mac" and then the 1-megabyte Mac Plus and, praise Allah, the LaserWriter. The LaserWriter actually changed how, even where, people worked. With a Mac and a LaserWriter, people could and did take their jobs home, creating back-bedroom DTP shops and making *surge suppressor* a part of many more people's vocabularies.

And then came the Mac II.

The Mac II gave us what we'd been asking for: color, more memory, better performance, expandability. In short, it fixed the Mac's flaws, or anyway, the flaws we'd noticed up to that point. I bought one of these $5,500 machines right away.

But the Mac II looked like a — a computer!

And Apple had done it on purpose! It had taken our cute little toaster and turned it into a CPU chassis and monitor that could have been designed for IBM.

Still, when we turned on our Mac IIs, they smiled at us. This II, we reassured ourselves, was still a Mac, even though Apple started using a colder-looking "platinum" case.

The Mac was growing up, all right. Somewhere in the late '80s, we stopped naming our Macs, probably about the time Apple got carried away with naming them for us. First came the cryptic codes — SE, IIci, IIfx, LC, IIsi, IIvx — all designed to sound like they stood for something. Then came the car models — Centris, Performa, Quadra. *Centris?* What were we to make of a name like Centris? That it was liberal on social issues but conservative on the economy?

Apple changed some things besides the names. The system software continued to evolve, with innovations such as QuickTime and AppleScript extending the expressive power and the user interface of the Mac. Building in a CD-ROM drive was nice too.

But whatever the new machines were called, whatever features they offered, they were all unmistakably still Macs.

In fact, it began to sink in that whatever it was that made a Mac a Mac was no longer entirely in Apple's hands. "Macness" had gotten associated with how we related to the thing. Mac users apparently didn't think of their machines in the same way PC users thought of theirs. You could see it in the best-seller lists: The top-selling PC programs were typically business applications. The top-seller list for the Mac typically included at least one program that floated fish, toasters, or geometric designs across the screen.

We probably weren't doing Apple any favors by encouraging all of this whimsy. By this time, Apple had itself a serious computer, an adequate list of third-party applications, and a credible argument that Mac users were more productive than PC users. It was trying awfully hard to get the Mac taken seriously as a business machine, and the culture that had developed around the Mac wasn't helping its story. I suppose that once you've had a moose head appear unexpectedly on the screen and tell you you're getting very sleeeepy, it's sort of hard to imagine trusting your payroll to the machine.

Although Apple didn't seem to be making a whole lot of progress getting itself and its computer taken seriously in the Fortune 500, it was certainly not for lack of trying. Product-development cycles shortened, and top executives were shuffled around what seemed like every couple of months. Apple has always been a company willing to — what's the phrase John Sculley's friend Bill always uses? — embrace change.

And we Mac users have had to do likewise. I admit to some nostalgia for the original 128K Mac, but I wouldn't want to go back. I'll gladly embrace change when it means price cuts. And I fully approve of the PowerBooks and the new AV Macs. Speech input seems to me altogether consistent with the original vision. As for the boxy, computerlike design of the Mac IIs, well, sneak peeks at new Mac models in the works suggest that Apple still knows something about elegance.

So maybe the Macintosh of today is not the cute little toaster of 1984, maybe childhood must have an end, maybe "The Wonder Years" had to have a final episode.

And maybe you'll see me near the front of the line for a PowerPC Mac.

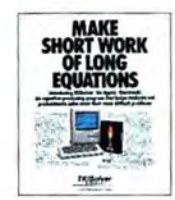
1984

Apple's net revenue: **$1.52 billion**

The Macintosh is launched with all the hoopla Steve Jobs can muster. In response, orders pour in. Peat Marwick snaps up 2,500 Macs, and (thanks to the new Apple University Consortium) 24 universities — including the Ivy League schools — commit to purchasing $3 million worth of Macs. This marks the first time a computer maker attempts to influence the platform preference of tomorrow's leaders. By the end of the year, though, the Mac is in trouble. Only a handful of software packages have shipped, and practically no hardware is available. Dealers begin returning Macs to Apple.

GIAMPIERO BENVENUTI

MORE THAN 100 developers — including giants such as Lotus, Microsoft, and Software Publishing — announce support for the Mac. Of the Big Three, only Microsoft manages to ship products this year.



If Apple builds it, they will come: a few of the products that ship this year.

10 Things That Make the Mac Different:

1. The shape.
2. The mouse.
3. The windows.
4. The icons.
5. The fonts.
6. The 3.5-inch floppy drive.
7. The slogan "For the Rest of Us."
8. An advanced microprocessor.
9. Digital sound.
10. MacInTalk.

APPLE WORRIES that no one will get the Mac right, so it introduces three landmark applications — MacPaint, MacWrite, and MacDraw — to set the standard.

APPLE COMPUTER

THE "1984" SPOT, which will prove to be one of the best-remembered ads of all time, airs during Super Bowl XVIII. No Macs appear in the ad.

WHAT DO THEY KNOW? ***Advertising Age*** **names "Test Drive" one of the ten best promotions of the year. But dealers can't cope with the paperwork, and Apple's inventory is tied up during the Christmas selling season.**

JULIE CHASE

Mac 512K ships.

"I'm glad to be out of that bag."
— the 128K Mac, introducing itself

"You mean you really want to show this?"
— Mike Markkula, Apple Board of Directors, to Steve Jobs, on seeing the 1984 ad

"Silicon in one end, Macs out the other."
— Steve Jobs, on the automated factory for Macs

Apple's net revenue: **$1.92 billion**

1985

The Mac isn't living up to its initial promise — sales are sluggish, the IBM PC reigns supreme, and Apple's lavish Mac marketing campaigns are all misfiring. In June, Apple crashes. President John Sculley announces a major reorganization along functional, not product, lines. Apple lays off 20 percent of its workforce and closes three manufacturing plants. Cofounder Steve Jobs is forced out. And Microsoft ships Windows 1.0, a shell for DOS that borrows certain Mac elements with Apple's permission. On the bright side, more than 30 percent of all Macs now sell to schools. Jobs' last official action at Apple is to authorize $200,000 to start the AUC in Europe.

APPLE COMPUTER

Misguided Marketing . . .

1. The lemmings commercial.

2. The Mac Office campaign. Apple introduces the LaserWriter and AppleTalk. No one buys the combo as an office solution, however.

3. The Mac Office again. Apple and 28 developers dominate *The Wall Street Journal* with fresh ads.

4. The Lisa is renamed the Mac XL.

LOTUS SHIPS JAZZ, the program everyone *thought* would be the Mac's white knight. It stiffs. Meanwhile, Microsoft ships Excel. Finally, a business program that's better than its DOS cousins.

THE MAC'S UNLIKELY WHITE KNIGHT: Aldus PageMaker 1.0. Apple relaunches the Mac with LaserWriter as a desktop-publishing system.

MACUSER DEBUTS, flaunting a quirky style.

APPLE COMPUTER

Products of the Year:

1. Dayna's MacCharlie, the first attempt to make Macs DOS-compatible.

2. The GCC HyperDrive, an internal 10-megabyte hard drive plus 348K of memory.

3. Microsoft Word — the first step beyond MacWrite.

BOARDROOM WARS:

DIANA WALKER/TIME MAGAZINE

Friction between Sculley and Jobs worsens. Jobs leaves to form NeXT, taking five key Apple employees with him.

JULIE CHASE

Charismatic Jean-Louis Gassée, head of Apple France, arrives in Cupertino to take over product development.

WILL MOSGROVE/APPLE COMPUTER

Mike Spindler takes over Apple Europe. He's one of many who think Apple should make PC clones.

. . . but Revolutionary Products:

1. No one knows it yet, but the $6,999 LaserWriter will save the Mac.

2. At first it seems as if AppleTalk just makes it easier to hook up a printer, but it's soon apparent that the world's first easy networking has arrived.

3. With HFS and version 5.0 of the Finder, Apple quietly revolutionizes the Mac's architecture. Few realize the importance of this step.

1986

Apple's net revenue: **$1.90 billion**

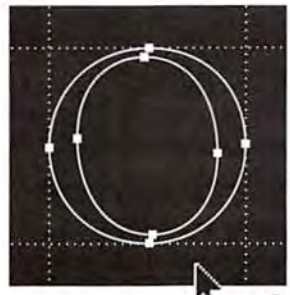
The Mac comes back strong. Faced with going out of business in mid-1985, Apple turns all of its attention to getting the Mac Plus out. Finally there's a Mac that can connect to a world of peripherals and that has enough memory for serious work. By the end of the year, the Macintosh begins to outsell the Apple II.

APPLE COMPUTER

THE $2,599 PLUS packs 1 megabyte of memory, two floppy drives, and a SCSI port. Apple also ships the LaserWriter Plus.

3 Things Apple Does That Help Save the Mac:

1. Forms APDA, a clearinghouse for developer services.
2. Opens Apple Centre dealerships in the UK.
3. Introduces KanjiTalk.



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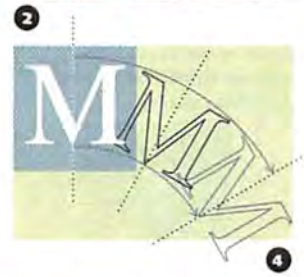
2

AT LAST, THE MAC HAS ENOUGH MEMORY and storage for the desktop-publishing revolution to kick in. Products of the year include:

1. Altsys Fontographer, the first outline-font editor for any personal computer.
2. Nearly 100 typefaces for PostScript printers, from Adobe.
3. The Mac's first external monitor, the Radius Full Page Display.
4. Cricket Draw, the first PostScript drawing program.



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MICROSOFT ANNOUNCES that the next versions of Word and Excel will not be copy protected.

3

THE FIGHT FOR STORAGE: GCC's HyperDrive develops reliability problems. SuperMac steps in with the DataFrame, the HyperDrive's first true competitor. Infosphere ships MacServe, the first hard-drive server for AppleTalk.

HOW TO MAKE $600,000 ON A $99 PRODUCT IN JUST SIX WEEKS: Silicon Beach ships SuperPaint, the first program to combine draw and paint capabilities.

3 Things Apple Does That Don't Help:

1. Purchases Cadmus, after the company shows Mac applications running on its workstations.
2. Offers Ashton-Tate $500,000 to finish dBASE Mac.
3. Unbundles MacWrite and MacPaint.

APPLETALK CABLES and connectors are expensive and hard to find. Farallon ships its PhoneNet connectors.

Apple's net revenue: **$2.66 billion**

1987

The Mac-as-toy syndrome ends. The Mac II — a big, noisy workhorse of a machine — comes with expansion slots, a 68020 processor, color, and a built-in hard drive. The 13-inch AppleColor monitor is better than anything for the IBM PC, and it's in short supply by fall. As if to legitimize the Mac, Colby and Dynamac ship clones — but *you* have to supply the ROMs. The one millionth Mac rolls off the assembly line in March.

P.F. BENTLEY/TIME MAGAZINE

APPLE COMPUTER

The Mac opens up — even the SE has an expansion slot — and the add-on market comes of age.

APPLE ADDS SOME SOFTWARE . . .

- **HyperCard, a "software erector set," is bundled with all Macs. Apple desperately needs something to differentiate the Mac, but HyperCard isn't it.**
- **MultiFinder ships as part of System 6.0. Now 2 megabytes isn't enough.**

. . . AND DUMPS EVEN MORE:

CLARIS®

Apple forms Claris, a company that can support the application software Apple is ignoring. Apple promises that Claris will eventually become an independent entity.

QUALITY CONTROL RUN AMOK: Microsoft Word's first major upgrade, version 3.0, ships with more bugs than the American embassy in Moscow. *MacUser* implements a "no reviews of beta products" policy.

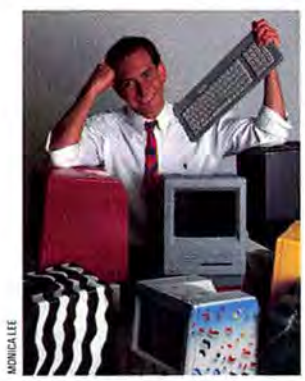
THE PAGE-LAYOUT WARS BEGIN: Aldus ships PageMaker 2.0 and Quark releases QuarkXPress. Letraset buys ReadySetGo! from Manhattan Graphics and raises the program's price by $325. Boston Publishing Systems picks up the clunky LetraPage from Letraset and renames it Mac-Publisher III. Target preannounces Scoop, a product its users might rather forget.

SOFTWARE EXCITEMENT OF THE YEAR:

- **Adobe ships Illustrator, a professional PostScript drawing program.**
- **Guy walks. Apple evangelist Guy Kawasaki leaves to become president of ACIUS, the U.S. distributor of 4th Dimension, the French database product Apple abandoned.**

The Year of the Network (for real this time):

1. **AppleShare file-server software ships.**
2. **Sun buys TOPS from Centram.**
3. **Shiva ships the NetModem, the first sharable modem.**
4. **Think Technologies ships InBox, the first Mac e-mail system.**



MONICA LEE

DAVE SIEGEL CUSTOM-PAINTS MACS: cost, $200 to $5,000. Sculley gets a granite one.

MICROSOFT pays Forethought $14 million for PowerPoint. Meanwhile, Forethought's real money earner, FileMaker, reverts to Nashoba, the original developer.

APPLE COMPUTER

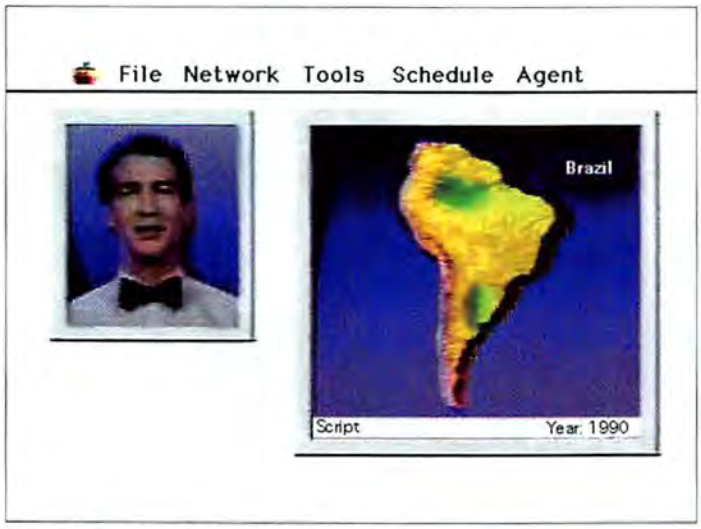
WIN SOME, LOSE SOME:

- **GCC ships the PLP, a slow QuickDraw printer — but it's half the price of the Apple LaserWriter.**
- **Apple introduces the ImageWriter LQ, a printer with spacing problems.**
- **The AppleFax modem ships. It just doesn't work.**

1988

Apple's net revenue: **$4.07 billion**

The low-growth year. The market slows, as recession hits the U.S. Still, Apple does well, thanks to the strong product introductions of the previous year and to all-time-high gross margins. The company celebrates its first billion-dollar quarter, and by the end of the year, it has shipped more personal computers than IBM.



APPLE'S KNOWLEDGE NAVIGATOR VIDEO creates a stir with an anthropomorphic agent dubbed Bow Tie. But this isn't a product — it's Sculley's attempt at being a visionary.

APPLE COMPUTER

IF YOU CAN'T BEAT 'EM, JOIN 'EM: The IIx is the first Mac to use a high-density floppy drive that can read PC disks. It's also the first 68030 Mac.

Viruses in the News:

1. The first Mac virus, MacMag Peace, wishes users well on March 2.

2. nVir and Scores — not-so-innocent viruses — appear.

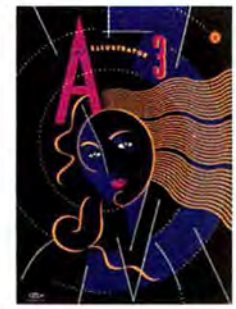
DIANA WALKER/TIME MAGAZINE

ILL-FATED PRODUCT INTROS:

- **The NeXT computer. Stylish, yes, but incompatible.**
- **FullWrite Professional. Buggy, ravenous for RAM, and now owned by Ashton-Tate, it doesn't have a chance.**

JOHN HARDING

DEC AND APPLE AGREE to integrate Macs with VAXes. But the agreement is valid only in the U.S. Multinational companies shrug. The deal sours.



THE BEST OF THE YEAR:

- **The LaserWriter II family — the IINTX, IINT, and IISC.**
- **The QMS ColorScript, the first color PostScript printer.**
- **Pinnacle's erasable optical drives.**
- **Swivel 3D.**
- **FreeHand 1.0.**
- **Illustrator 88.**
- **QuickMail.**

7 Steps to the Great Mac Price Flip-Flop:

1. Memory chips are in short supply. Prices rise by 150 percent.

2. Apple COO Del Yocam orders a stockpile of high-priced DRAM.

3. The chip drought ends.

4. Apple is forced to raise prices on the Mac II and SE.

5. Sales fall.

6. Apple rolls back prices.

7. Yocam lands a new job as president of Apple Pacific and later resigns.

TIRED OF PAYING steep royalties for Adobe PostScript and feeling the competition from other printer makers, Apple announces its own font technology, TrueType.

HYPERCARD TURNS 1, and Apple hosts an extravagant birthday bash.

Apple's net revenue: **$5.28 billion**

1989

The desktop-media push.

The year of bad karma and good color.

Windows attempts to catch up to the Mac, Xerox sues Apple, the Adobe/Apple rift turns into a chasm, and the Mac's source code is stolen. The bright spot is Apple's release of 32-bit QuickDraw. All of a sudden, we have 24-bit-display cards and scanners, compression utilities, 32-bit paint programs, and more.

"The biggest bunch of mumbo jumbo I've ever heard in my life."

— Adobe's John Warnock, reacting to the Apple/Microsoft alliance

Applause and Arrows:

RasterOps ships the first under-$1,000 24-bit-color board.

INITs proliferate, and so do the conflicts.

System 7 is unveiled to developers.

Apple hard drives have a "sticky actuator" defect.

Claris ships MacWrite II and MacDraw II.

Prodigy censors users' messages.

APPLE AND MICROSOFT put their joint muscle behind TrueType and TrueImage. Adobe releases the closely guarded specs for Type 1 fonts and ships ATM. Confusion reigns supreme.

APPLE SELLS all of its Adobe stock for $91 million.

HEWLETT-PACKARD'S first Mac printer, the DeskWriter. At $1,195, it's cheap, and the quality is good.

Top 10 Product Battles:

1. FreeHand 2.0 vs. Illustrator 88.
2. Relational-database programs: 4D, Double Helix, FoxBASE+/Mac, and Omnis 5 all get major upgrades.
3. Virus utilities: Virex, Vaccine, SAM, and Disinfectant lead as developers cash in on the virus fad.
4. MasterJuggler vs. Suitcase.
5. After Dark vs. Pyro.
6. QuarkXPress 3.0 vs. PageMaker.
7. WingZ vs. Excel.
8. Windows vs. Mac.
9. HyperCard vs. SuperCard vs. Plus.
10. ColorStudio vs. PixelPaint Professional.

DOUG MENUEZ/REPORTAGE

THE WORLD'S MOST intelligent boat anchor:
WEIGHT: 15.7 pounds.
PRICE: $6,500.
TIME TO DEVELOP: five years.
The Mac Portable ships.

SPENCER/GLOBE PHOTOS

THE BEATLES' COMPANY, Apple Corps, sues Apple over the Mac's sound-synthesizing capabilities.

P. F. BENTLEY/TIME MAGAZINE

THE SAN FRANCISCO EARTHQUAKE reminds us how vulnerable we are. Two *MacUser* editors, John J. Anderson and Derek Van Alstyne, are killed by a crumbling brick facade. Apple loses a major R&D building.

APPLE COMPUTER

ALSO NEW FROM APPLE:
1. The SE/30.
2. Monochrome monitors.
3. The Mac IIci, the first Mac with built-in color video.

PETER FOX

Gassée assembles a Mac IIcx onstage and then boots it, showing how easy — and inexpensive — this baby IIx is to manufacture and service.

1990

Apple's net revenue: **$5.56 billion**

A good year for users, but Apple's running scared. With Microsoft's introduction of Windows 3.0 and with the cost of PCs plummeting, Apple rethinks its business. Under pressure, the company introduces low-cost Macs and printers. The products are a hit, but with hardware margins down, Apple reorganizes yet again and reevaluates its decision to spin off Claris.

WILL MOSGROVE/APPLE COMPUTER

APPLE'S LOW-COST MACS — A PRICE WE LIKE:

- **For now, the Classic is Apple's best-seller. Its sales raise the Mac's market share by 5.8 percent.**
- **The IIsi and LC sport a supposedly sleek, stylish look. But most people refer to them as pizza-box Macs.**

WHO'S IN:

WILL MOSGROVE/APPLE COMPUTER

Spindler is named president of Apple.

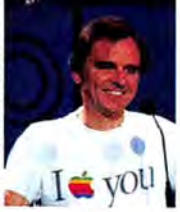
APPLE COMPUTER

Sören Olsson is named president of Apple Europe.

WHO'S OUT:

APPLE COMPUTER

The unpopular Allan Loren, head of Apple USA, resigns.



WILL MOSGROVE/APPLE COMPUTER

Gassée resigns. Sculley takes over R&D.

APPLE COMPUTER

JOHN SCULLEY and San Francisco mayor Art Agnos present Mikhail Gorbachev with a Mac IIcx. No word on where he'll get support.

CLARIS®

APPLE DECIDES that software is critically important to its future and reabsorbs Claris. Within a year, Claris' top execs all walk.

WILL MOSGROVE/APPLE COMPUTER

APPLE INTRODUCES its first low-cost printers, the LaserWriter SC and the LaserWriter NT.

7 Things That Make Apple Proud:

1. Sponsoring Janet Jackson's tour of Japan.
2. Licensing AppleTalk.
3. Extending the warranty to one year.
4. Being listed on the Tokyo stock exchange.
5. Investing in ARM, Ltd., the maker of a low-power RISC chip.
6. Shipping a beta version of System 7.
7. Starting General Magic.

HARD-DRIVE MANUFACTURER JASMINE files for Chapter 11. Some 2,000 customers are left with unfilled orders — many have already paid.

Product Award: Adobe Photoshop

WILL MOSGROVE/APPLE COMPUTER

THE WICKED-FAST IIFX ships. It's Apple's fastest, most elegant design to date.

Muddled Deal of the Year:

Apple upgrades HyperCard and sends it off to Claris. Both companies distribute the product. Apple's version is free, but users can't access the scripting level. Claris charges $199, but you get all the features. Users quickly figure out that by typing Go Magic in the correct message box, they can get scripting in Apple's version.

Apple's net revenue: **$6.31 billion**

1991

In a flurry of activity, Apple hosts its biggest product introduction yet; ships a raft of peripherals; and best of all, gives us true portable computers. The company slashes prices; offers rebates; and in the only move that mars the year, lays off 1,500 people. Alliances, mergers, and licensing agreements are in vogue, as Apple and third parties search for ways to remain profitable. The LC becomes Apple's best-selling computer.

LIGHTS, CAMERAS, MACINTOSH: Apple ships QuickTime. The images are small and grainy, but it's still the most fun we've had since HyperCard.

Mergers and Alliances:

1. Borland swallows Ashton-Tate.

2. Macromind and Paracomp form Macromind•Paracomp.

3. Farallon sells the MacRecorder and SoundEdit to Macromind•Paracomp.

4. Apple agrees to include Adobe Type 1 in a future version of its system software.

5. Apple licenses AppleTalk to Novell.

AFTER SEVERAL DELAYS, Apple ships System 7. Users are slow to switch to the memory-hungry system.

APPLE COMPUTER

SCULLEY SHOWS APPLE'S OBJECT-ORIENTED-SOFTWARE PROJECT, Pink, to IBM engineers, and before you know it, the two companies are in bed together. Many say the affair will never work.

JOHN GREENLEIGH/APPLE COMPUTER

POWER IN A TOWER: the first 68040-based Macs, the Quadras.

It's About Time:

1. ClarisWorks — integration that works.

2. WordPerfect 2.0 — at last, a Mac interface.

3. Toll-free technical support for System 7.

4. The StyleWriter — Apple makes a product for the home.

> **"The only strategic relationship that works is a purchase order."**
>
> *— Scott McNealy, CEO of Sun*

JOHN GREENLEIGH/APPLE COMPUTER

LAPTOPS OF THE RICH AND FAMOUS: The well-designed PowerBook becomes a power accessory for everyone from Barry Diller to Demi Moore.

Lotus®

PERSISTENT COMPANY OF THE DECADE — LOTUS:

1. Lotus sinks $10 million into MarketPlace. User outrage over privacy issues forces it to drop the product after only five months.

2. Lotus buys cc:Mail.

3. Lotus ships 1-2-3 for Mac, nine years after the PC version shipped and eight years after it announced support for the Mac.

FUN STUFF

Broderbund's Kid Pix

Reactor's Spaceship Warlock

> **"They're trying to solve all problems of human communication in a piece of software."**
>
> *— Reese Jones, CEO of Farallon*

Apple outlines OCE, its ambitious communications architecture.

1992

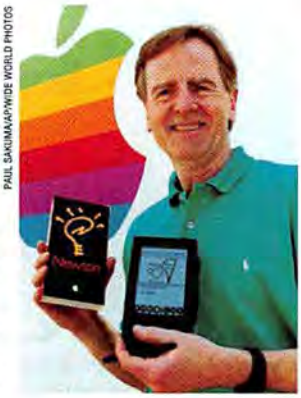
Apple's net revenue: **$7.09 billion**

JOHN GREENLEIGH

CPUs OUT THE WAZOO: We've got PowerBooks; we've got the LC II; we've got the IIvi; we've got the Quadra 950; and best of all, we've got the Duo Dock. Now if only we could figure out what to buy.

Where is Apple going? Apple shifts its product cycle into high gear by introducing 12 new Macs, invests heavily in technologies from PDAs to multimedia to the PowerPC, and expands customer support. Distribution undergoes a radical change — Macs are sold through mail order and mass-merchandise retailers, and Apple forms PIE, its consumer division. QuickTime spawns ever-better CD-ROM titles and a raft of new products. PowerBooks have become a $1 billion business; Apple's revenue and net income peak.

PAUL SAKUMA/AP/WIDE WORLD PHOTOS



Firsts:

1. Cypress ships PhonePro, the first product that lets you program your Mac to handle telephone functions.

2. Apple demonstrates Casper, its half-deaf speech-recognition technology.

3. Adobe ships Myriad, its first multiple-master typeface.

4. Apple publishes a mail-order catalog for users.

5. Apple charges users for two system-software add-ons: the QuickTime Starter Kit and Macintosh PC Exchange.

"The mother of all industries."
— John Sculley, on what the Newton represents
Apple unveils the technology behind its Newton line of PDAs.

QUICKTIME GROWS UP:
1. Version 1.5's compressor gives us larger movies and smaller files.
2. Apple ships QuickTime for Windows.

WILL MOSGROVE/APPLE COMPUTER

APPLE INTRODUCES its first products for Intel-based PCs.

JOHN GREENLEIGH/APPLE COMPUTER

JOHN GREENLEIGH/APPLE COMPUTER

3. Fast, Photo CD-compatible CD-ROM drives.
4. SuperMac's VideoSpigot, the first low-cost video-digitizing card.

5. Adobe Premiere, video-editing software that started life as SuperMac's ReelTime.

WINDOWS 3.1 ships with TrueType built in. The market for TrueType fonts finally takes off.

THE SYSTEM 7 INSTALLED BASE reaches 4 million, mostly because it's what ships with all new Macs.

NEAT STUFF

BERKELEY SYSTEMS' Star Trek: The Screen Saver

JONATHAN LEVINE

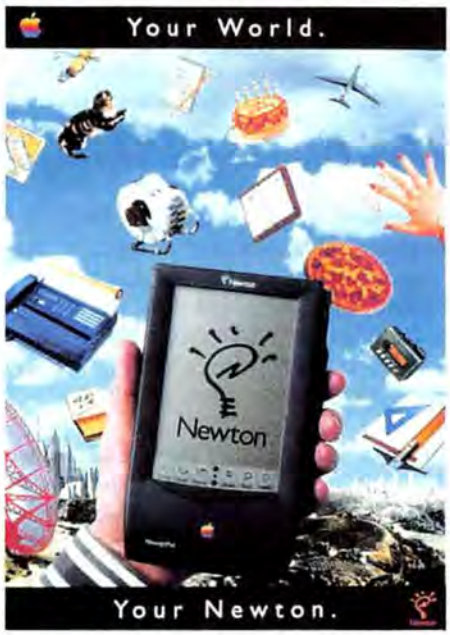
YOU'VE SEEN THESE MACS BEFORE: Apple launches the Performa series — these renamed Classics, LCs, and IIvx's are sold through such retail outlets as Sears and Circuit City.

Apple's net revenue: **$7.98 billion**

1993

Apple's schizophrenic tendencies worsen.

The company introduces consumer products, PowerBooks, desktop Macs, multimedia machines, and workgroup servers — and its plans for the next generation of products based on the PowerPC chip. Revenues for the first fiscal quarter hit highs of $2 billion, but net income is down. Sculley resigns, and Mike Spindler takes the helm as Apple CEO. Another reorganization and a series of layoffs follow — for the first time, even Mac engineers aren't exempt.



128K MAC, TAKE 2?
Apple launches the Newton. There isn't much third-party software, the memory is limited, and the handwriting recognition is inadequate.

THE SHAKE-UP OF 1993:

JULIE CHASE

As Apple's woes mount, Sculley resigns, taking a top job at Spectrum Information Technologies, Inc.

ED KASHI

The pragmatic Mike "Diesel" Spindler takes on the CEO post.

How to Lose Friends and Make Enemies:

1. Introduce a new Mac in late 1992.
2. Name it the IIvx.
3. Give it a built-in CD-ROM drive, a reasonably fast processor, and a nice price.
4. Get the press to rave about it.
5. Replace it in five months with a faster Mac.
6. Name that Mac the Centris 650, and price it $500 less than the IIvx.
7. Presto! Instant enemies.

TOM ZIMBEROFF/APPLE COMPUTER

Executive VP Al Eisenstat — the man often credited with maintaining stability — leaves, suing Apple over his dismissal.

PETER STEMMER

Roger Heinen, head of Apple's software division, heads for Microsoft.

SIXTY-THREE MONTHS of litigation among Microsoft, HP, and Apple end. Infringement claims are dismissed. To take up the slack, Berkeley Systems sues Delrina over flying toasters. Delrina backs down.

JOHN GREENLEIGH/APPLE COMPUTER

LANDMARK MACS:
The Centris 660AV and Quadra 840AV, Apple's first foray into multimedia hardware. The products are so complex that, for the first time, different groups of engineers design different components.

CLARIS CAD — A NICE PRODUCT that once held a 40-percent market share in a pond too small for Microsoft-wannabe Claris — is discontinued.

Not Ready for Prime Time:

1. The PowerBook 165c.
2. Apple's first consumer-electronics product, the PowerCD.
3. The Apple Color Printer.

GOLD-STAR PRODUCTS:

JOHN GREENLEIGH/APPLE COMPUTER

The Color Classic

Gold Disk's Astound

The HP LaserJet 4ML

System 7 Pro

THE HYPERCARD SAGA CONTINUES:
HyperCard engineers trek back to Apple as both Claris and Apple come to realize that HyperCard is a developer tool, not a user product.

Why 2004 Won't Be Like 1994

BY JON ZILBER

A special preprint from the January 2004 issue of MacUser.

The just-announced MAC Ultra bears an uncanny resemblance to the original Macintosh unveiled 20 years ago — from the front, at least. But when you look from the side or the back or peek inside, nostalgia gives way to awe, as you ponder the technological advances of the intervening decades.

For starters, the Ultra is less than an inch thick and weighs less than a pound. It uses a superpowerful 6200 PowerPC chip, and of course, it's battery-powered, running for about two weeks on two standard AAAAA batteries. The flat-panel color display sports greater visibility and sharper resolution than the original Mac's monochrome display — and can be detached for use as an overhead display unit.

The Ultra's base configuration — 128 megabytes of RAM, a 2-gigabyte hard drive — makes the original Mac's specs seem Lilliputian, although most of today's users will opt for configurations at least twice as large. An optional keyboard is available (with a Dvorak or QWERTY layout), as is a built-in scanner, but most people will prefer to use pen- or voice-based input. You can also get a 3-D mouse for use with multidimensional games and CD-ROM-based educational software. A few productivity applications, such as spreadsheet and page-layout programs, also take advantage of the extra dimension to manipulate complex data.

What a long, strange trip it's been since 1994! In celebration of two decades since the birth of the Macintosh, a stroll down memory lane is in order. Here are some of the key changes in hardware, software, and system architecture and in Apple's corporate strategy that make the Ultra a totally different machine from its ancestors — and totally different from other computers on the market today:

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What's in a Name?

After flirting with friendly English-like names (the Macintosh, the Plus, the Classic, the PowerBook), technoid alphanumeric names (the IIfx, the IIci, the LC 520), and corny neologisms (the Quadra, the Centris, the Performa — and let's not forget the fiasco of 1995, the Sluggo), Apple adopted a completely new umbrella nomenclature for its increasingly schizophrenic product line.

The product lineup from Apple, as of 1995, included modular Macs (in 68040 and PowerPC configurations); workgroup servers; conventional PowerBooks; dockable Duo notebooks; Newton-based PDAs; and the MacPC, manufactured by Dell and based on an Intel chip. After struggling for years to retain the value of the Macintosh brand name when most of Apple's revenues came from products that were not, strictly speaking, Macintoshes, Apple rechristened the whole shebang the Apple MAC family. No official explanation of the acronym was given, although the pundits were quite quick to offer their explanations (Maggie Canon: Multiple Architecture Chaos; Andy Ihnatko: More Apple Confusion; John Dvorak: My Absolute Consternation).

The Balkanization of Software (or How the Mac OS Survived the Windows Challenge)

In 1994, application software changed in two dramatic ways, thanks to technologies that made software more adaptive to the needs of individual users. The first of these software paradigm shifts was Apple's OpenDoc architecture, a standard for mixing and matching software components. Endorsed by Apple and by such partners as IBM, Novell, Oracle, WordPerfect, and Xerox, OpenDoc had been launched in 1993 under the aegis of the cooperatively run Component Integration Laboratories.

About this time, Apple's age-old competitor Microsoft began including its software mix-'n'-match standard, OLE (Object Linking and Embedding) 2.0, in its Windows and Mac applications. Both OLE and OpenDoc allowed users to transcend merely cutting and pasting data among applications — for instance, when you clicked on, say, spreadsheet data pasted into a word-processing document, the spreadsheet application's menu bar appeared and the data could be manipulated as spreadsheet data.

OLE, however, suffered from a serious setback. Microsoft was in no position to be as vigilant a policeman of the interfaces of third-party applications as Apple was with Mac applications. So with OLE, every time you clicked on different items in a compound document, you played Russian roulette with your interface: Menu bars rearranged themselves, keyboard command equivalents changed, the positions of navigational tools were in a continual state of flux, and so on.

The OpenDoc format began to win market acceptance around 1995. And thanks to the consistent interfaces of OpenDoc-savvy programs, Apple's standard eventually garnered broader support than OLE across Mac, PC, and UNIX platforms. What clinched OpenDoc's success was when Viacom began broadcasting its cable-TV lineup in the OpenDoc format, so it could be uploaded directly into Mac-compatible home-electronics control consoles.

Smarter Than the Average Software

The other major change in software was the advent of intelligent agents that provided built-in expertise on accomplishing the task at hand. Apple's first attempts at using intelligent agents were clumsy — for instance, the first Newton, the MessagePad, had only a limited set of action words its intelligence could recognize.

Microsoft — in several of its Windows applications — led the first real attempt at personalized software. Its software "wizards" helped users perform such tasks as creating charts in spreadsheet programs (for instance, suggesting chart formats appropriate to the selected data). They also automated tasks by detecting patterns in the way users interacted with their software.

But in the mid-1990s, Apple leapfrogged Microsoft's lead, by creating (and subsidizing) standard MagicHelp agents, which third-party developers could add to their software. In contrast, Windows-based agents were limited to products from a handful of large developers.

These two trends — smart agents and mix-'n-'match software — signaled the end of the era of escalating featuritis in applications. Mac users preferred to customize their own suites of applications built from scaled-down software components that seamlessly plugged and played together. And as a result, small developers — who were now better able to compete against the major players — flocked back to the Mac market.

3-D for the Rest of Us

The long-awaited Next Killer App — RealDraw, a revolutionary product from a former NeXT developer — finally arrived in 1997. RealDraw used a graphics-recognition engine based on technologies pioneered in the Newton operating system to deconstruct 2-D images and form 3-D models from their components. You could simply scan in a photograph to create a realistic 3-D model that could be rotated, distorted, edited, morphed, or viewed from any vantage point.

The sudden ubiquity of 3-D models prompted sweeping changes in the Mac's antiquated hardware interface: 3-D mice (cordless, of course) became commonplace, and scanners were a must. In 1999, Apple also introduced a virtual-reality extension in System 9, prompting a flood of new games and entertainment and educational software (which finally helped Apple regain its dominance in the education market). All of a sudden, Mac users were sitting at their desks wearing expensive but fashionable headgear and nodding voraciously at their computers. A rash of neck injuries made the news.

Floppies Exit, Stage Right

With CD-ROM drives built in to all new machines since 1994, an upgrade of the floppy drive was long overdue. In 1995, Apple went out on a limb by offering a PCMCIA option in lieu of the floppy drive on desktop machines and notebook computers. Although the $15 10-megabyte cards cost more per byte than floppy disks, users were surprisingly quick to adopt the new format. The extra elbowroom proved essential, and the cards allowed users to easily swap data among their notebook, PDA, and desktop machines.

Floppy disks persisted for a few years as a disposable form of distributing and sharing software and data. But by 1998, as the price of a 20-megabyte PCMCIA card dropped to less than $5 and most files couldn't even fit onto a standard 6-megabyte floppy, floppies drifted off to data-storage heaven.

Display's the Thing

The last monochrome desktop monitors went the way of the dinosaur in 1994, and the last gray-scale notebook computer was discontinued in early 1996. By the year 2001, CRT-based monitors were discontinued. Flat-panel units had long since become commonplace for 16-inch (and smaller) displays. And as flat wall-mounted TVs

caught on in the living rooms of America, the economies of scale for flat-panel displays (coupled with their reduced energy costs and low electromagnetic emissions) made flat panels viable for even the largest monitors.

The Call of the Wild

It's hard to imagine these days, but before 1996, most people had separate telephones on their desks and when they traveled, they carried both a notebook computer *and* a cellular phone with them (along with separate chargers and spare batteries for each). As cellular technology got cheaper and more common, however, most computers began to include cellular-phone functions inside the box.

Then computer manufacturers went a step further. All Macs released since 1996 have included sophisticated telephony features — auto-dialing, speaking, recording, voice mail (integrated with e-mail, courtesy of AOCE), call forwarding, and caller ID — integrated onto the motherboard. Apple's alliances with AT&T, BellSouth, Northern Telecom, and others ensure that Mac-based telephony works with virtually all business PBX and wireless systems.

The Age of Intimate Computing

With hardware margins continuing to tighten, Apple — like many other vendors — turned to the fashion aspect of computing as a road back to profitability. The Mac has always been a leader in design that was both functional and aesthetically pleasing. But it was only after the PowerBook replaced the cellular phone as the de rigueur techno status symbol in Hollywood and in the Business Class section of coast-to-coast flights that Apple began emphasizing the Mac (and in 1993, the Newton) as a personal fashion statement.

As computing devices became smaller and were more likely to be kept continually on your person, their role as fashion accessories and politically correct statements became increasingly important. The old standards of price, performance, features, and usability were joined by such matters as status-seeking industrial design and eco-concerns such as energy efficiency.

The most expensive (and most popular) products included those made from 100-percent recycled plastic. Of course, you could buy a variety of covers for the box — natural-colored synthetic leather and neon bright-colored rubber were the most popular. And to help you find these now-minuscule computers, you could easily train them to emit a customized noise when you said the word *lost* or any other four-letter word.

Reinventing the Core of Apple

In 1995, Apple finally caught up with the "value PC" trend that transformed the Intel-chip-based world and spun off the Performa line (along with the original Newton PDAs and the Claris Clear Choice software line) into a separate direct-sales subsidiary, AppleCore.

To help finance these changes, Apple sold a 10-percent interest in itself to Sony. Then in 1997, Sharp, the dominant manufacturer of color active-matrix LCD screens, acquired a 15-percent stake in Apple. Sharp wanted to leverage Apple's growing presence in the consumer-electronics market. In 1998, in the aftermath of the Sony/Sharp merger, SoSharp owned the largest single chunk of Apple stock and gained a controlling interest on Apple's board of directors.

A year later, Sony-labeled consumer products began sporting interfaces designed by Apple (or really by Apple's subsidiary General Magic) as well as the AppleSmart logo. Millions of VCRs finally stopped their endless blinking of 12:00—12:00—12:00. And shortly after the '00 presidential elections, Apple chairman Ross Perot left the company to become President Dole's ambassador to Japan.

The big Apple/General Motors deal of 2002 took everyone by surprise but proved a big success for both companies. The computational equivalent of a Quadra 9700 now drives new, high-end GM automobile features such as voice-controlled systems, user-friendly diagnostics, and CD-ROM-based travel information and navigational systems. The guts of the computer hardware can be removed from the dashboard as a detachable PDA module that automatically recharges and uploads pertinent travel-related data when docked back into the dashboard. (This gave a whole new meaning to the words *system crash.*)

In late 2003, in a sentimental reunion of sorts, Disney CEO John Sculley and reinstated Apple CEO Steve Jobs presided together over the ribbon-cutting ceremonies for MacDisneyPlace, near Apple's new corporate headquarters, in Austin, Texas. In addition to interactive virtual-reality "rides," the amusement center includes such tongue-in-cheek attractions as Software Pirates of the Caribbean and Mr. Gates' Wild Ride. And to nobody's surprise, one exhibit in particular is generating the longest lines: Tomorrowland.

Jon Zilber, a former editor-in-chief of *MacUser*, commutes to his job at Spacely Sprockets in his AppleSmart HeloCar.

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Announcing everything you'd expect in workgroup servers from Apple.

Introducing the Apple Workgroup Server 60, big support for small groups.

Introducing the Apple Workgroup Server 80, bigger support for medium-size groups.

The new Apple® Workgroup Servers 60 and 80 were designed not just to meet your expectations. They will undoubtedly exceed them.

Now, people can work together better using servers that are as easy to install and use as a Macintosh® personal computer.

Both high-performance servers allow departments and workgroups to collaborate and share files easily. So people spend a lot more time using information and a lot less time looking for it.

The Workgroup Server 60 is ideal for classroom and small-business settings. Installation is as easy as plugging it in and turning it on. And built-in networking means it fits into any office environment with a minimum of effort.

The Workgroup Server 80 is all this and more — more power and more performance for more people. An optional built-in DAT 4mm tape backup drive allows you to store gigabytes of information. It also comes with Dantz Retrospect Remote automated backup software to ensure that all your data is protected.

Both models arrive with System 7.1 and new AppleShare® 4.0 software pre-installed. Providing greater performance, ease and reliability than ever before. While products such as Farallon PhoneNET PC let MS-DOS and Windows users easily connect to any Apple server.

For still larger groups of people, we offer you the Apple Workgroup Server 95. Built around our performance-tuned UNIX®-based system software, A/UX® 3.0.1. And optimized to deliver stable, dependable file, print and database services.

No matter how many people you need to bring together, Apple provides a way to make it easier for them to share their ideas and information.

But then again, what else would you expect?

**Prices based on Apple Computer, Inc. direct prices valid as of October 21, 1993. Prices for the Apple Workgroup Server 60 with 8MB of RAM and a 230MB hard drive and the Workgroup Server 80 with 8MB of RAM and a 500MB*
†AppleShare administration averages $10,000 per year less than other systems, according to the Business Research Group (BRG) study "Lifecycle Costing for PC LAN Administration — A Comparative Analysis of 5 Leading NOS
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And a few things you wouldn't.

Introducing the Apple Workgroup Server 60, a complete solution including file-server software for under $3000.

Introducing the Apple Workgroup Server 80, a complete solution including file-server software for under $4500.

Clearly, the Apple Workgroup Servers 60 and 80 were built to meet the demands of every workgroup size.

What you may not have realized is how well they fit into every workgroup budget.

Because the simple fact is that all this power and flexibility come with remarkably affordable price tags.

Unlike comparably priced servers, Apple servers begin as complete systems. So you avoid the hidden cost of adding extra features we make standard. Such as file-server software and memory, as well as Ethernet and SCSI ports.

Best of all, Apple Workgroup Servers give you lots of room to grow. The Workgroup Server 60, Workgroup Server 80 and Workgroup Server 95 will all be upgradable to PowerPC.™

And because they're so easy to use and manage, they demand much less attention from network supervisors. In fact, an independent study showed that Apple servers deliver dramatic savings in the categories of support and training.†

Of course, your budget isn't the only thing we support at Apple.

The Apple Assurance℠ program provides free 24-hour, 7-day-a-week phone assistance to help you set up and start using your server. As well as on-site service options to keep it running at peak performance for a lifetime.

For more information and the name of your authorized Apple reseller, call 1-800-776-2333.

With Apple Workgroup Servers, it's never been easier to give people the power to work together. With the power you expect from Apple. The power to be your best.®

Apple

hard drive start as low as $2699 and $4369, respectively. Both systems include System 7.1 and AppleShare 4.0 pre-installed and built-in Ethernet support. Keyboard, display and appropriate Ethernet transceiver sold separately.
Environments." Environments compared were AppleShare, Banyan VINES, Novell NetWare, IBM LAN Manager and Microsoft LAN Server.
Computer, Inc. UNIX is a registered trademark of UNIX System Laboratories, Inc. PowerPC is a trademark of International Business Machines Corporation.

Cost-Conscious COLOR

Printing rainbow-tinted business documents doesn't require a pot of gold. Falling prices and rising output quality make desktop color a practical option. **BY BRUCE FRASER**

ADDING COLOR to business documents does more than dazzle the boss and grab your audience's attention — it helps you convey complex information easily. Color makes charts clear and easy to understand, highlights important points, and commands far more attention than black-and-white. So every businessperson should have a color printer, right?

WRONG — or at least until recently. Color printers used to be impractical for everyday business use — either they were too expensive, or their output quality was disappointing. But we've got good news: That's all changing.

PHOTOGRAPHY: WALT DENSON

$1,550

$2,100

$3,910

$2,675

$3,025

$2,895

At a Glance

▶ Hewlett-Packard DeskJet 1200C/PS	‡‡‡‡½
▶ Tektronix Phaser 200e	‡‡‡‡½
Apple Color Printer	‡‡‡
CalComp ColorMaster Plus 6603 PS	‡‡‡‡
Canon BJC-820	‡‡½
Hewlett-Packard PostScript PaintJet XL300	‡‡‡½
Lexmark IBM Color Jetprinter PS 4079	‡‡‡
Seiko Personal ColorPoint PSE	‡‡‡½

▶ *MacUser* Bottom Line pick

We rounded up eight reasonably priced color printers, ranging from the Apple Color Printer ($1,550 street) to the CalComp ColorMaster Plus 6603 PS ($3,910 street), and compared speed and output quality for a variety of business documents. We also looked at the real expense of owning and using each printer, evaluated ease of setup and use, reviewed the accompanying documentation, and appraised each vendor's tech support. We found several printers that strike a balance of high speed, good output quality, and low cost.

The printers we considered use either inkjet or thermal-wax-transfer technology to produce color. Inkjet printers store liquid ink in cartridges and spray it through tiny nozzles to form colored dots on the page. With thermal-wax printers, ink is stored on ribbons, which are heated by a tightly focused heat source so that dots of pigment melt and adhere to the page. The ribbons we used for our tests contain three ink colors — cyan, magenta and yellow — that are combined to form all the colors you print. Four-color ribbons, which add black ink to the mix, improve output but extend printing times.

Most of the printers we tested use PostScript technology to produce color images: Your Mac sends the printer a set of mathematical descriptions of a page's contents, and then an on-board microprocessor uses the commands to create an array of colored dots, or a *bit map* of the image.

The Tektronix Phaser 200e and the Hewlett-Packard printers feature Level 2 PostScript technology, developed by Adobe Systems, the company that developed PostScript. The CalComp ColorMaster Plus 6603 PS, the Lexmark IBM Color Jetprinter PS 4079, and the Seiko Personal ColorPoint PSE each use a clone of Adobe's earlier version of PostScript, Level 1. Level 2 PostScript is faster than Level 1 and provides support for color-management systems (see the "Trends" sidebar).

In contrast to the PostScript printers, the Apple Color Printer and the Canon BJC-820 have no processing ability of their own; they use your Mac's QuickDraw screen-graphics engine to generate bit maps.

Printer technology has a direct bearing on printing speed and the cost per page. A QuickDraw printer's speed depends on the speed of your Mac's CPU; with PostScript, the printing speed is dictated by the printer's on-board processor. The cost per page varies between inkjet and thermal-wax printers and also depends heavily on the types of documents you produce (see Figure 1).

Figure 1: The Money of Color

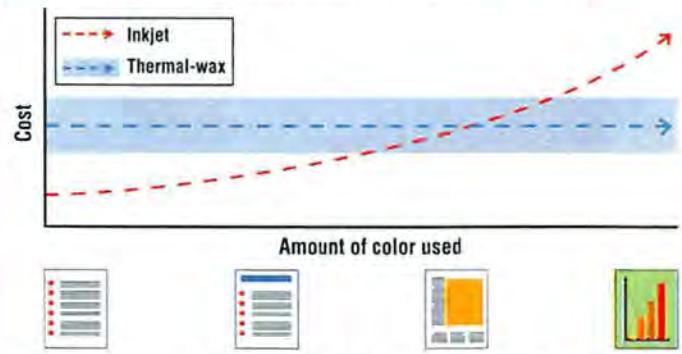


Figure 1: Increasing the amount of color on each page affects the ink cost per page for inkjet and thermal-wax printers differently. With inkjet printers, ink consumption — and the associated cost — is directly proportional to color coverage. With thermal-wax printers, the per-page ink cost is constant, whether the color covers a single pinpoint or the entire page. Inkjet printers are more cost-effective for low-color pages, but as coverage rises above 30 to 50 percent, thermal-wax printers become more economical. The kinds of documents you print the most dictate which technology costs you less.

Getting Started

Unpacking and setting up the printers posed no particular problems. We did note that the printers from Apple, Canon, and Lexmark arrived with extraneous and nonrecyclable packaging — Canon is the worst offender. In contrast, HP uses the minimum necessary packaging and uses recyclable materials wherever possible.

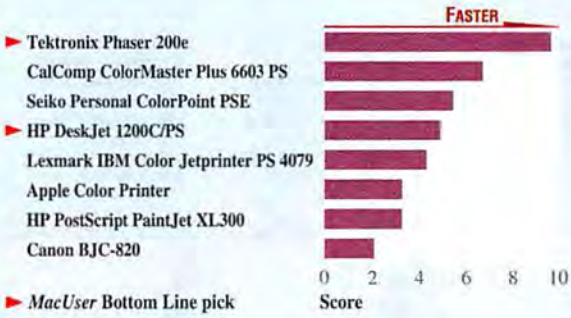
The Apple and Canon printers connect to the host Mac through the SCSI port, and despite SCSI's fickle reputation, we didn't run into any problems. All the other printers connect to the Mac via LocalTalk or through a direct serial connection.

Installing the inkjet printers' ink cartridges is a breeze: Each simply snaps into a well-marked receptacle on the printer.

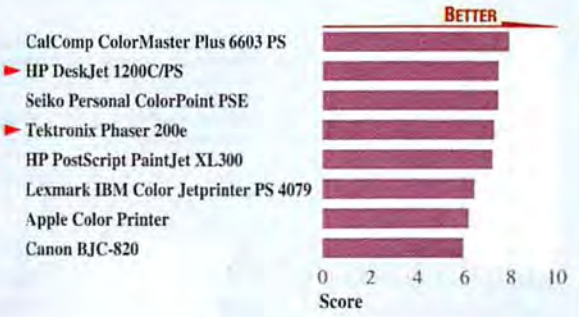
We found thermal-wax ribbons easy to install as well, although we did have minor problems with the CalComp ColorMaster Plus 6603 PS and the Seiko Personal ColorPoint

Figure 2: Overall Performance

Overall Printing Speed
This chart illustrates relative printer speed on a scale of 0 to 10, combining the results of our tests with three documents — a single-page chart generated with Microsoft Excel 4.0; a single-page illustration created with MacDraw Pro II; and a five-page presentation created with Microsoft PowerPoint 3.0, which was printed both on paper and on overhead-transparency media.



Overall Output Quality
This chart summarizes, on a scale of 0 to 10, the findings of a panel of experts who evaluated the quality of each printer's output with an eye toward color vibrancy, crispness of fine details, evenness of color blends, and uniformity in areas of solid color.



PSE. In the case of the CalComp printer, the instructions weren't clear and the first two prints from each new ribbon looked as if the ribbon were creased. With the Seiko printer, separating the take-up and supply rollers without damaging the ribbon was tricky, but we mastered the technique quickly.

Paper loading is simple, with a slight exception in the case of the HP inkjet printers. If you use the special paper HP recommends, you must take care to orient it correctly in the paper tray, because only one side is coated. The paper is marked with small black arrows, but users in a hurry might miss them.

Printer-software installation is also easy. Most of the printers use Apple's Installer utility to load the necessary software. The exceptions — the Canon and Seiko printers — use straightforward drag-and-drop procedures.

How's It Look?

Good-looking business documents are good for business, so when you're ready to buy a color printer, output quality should be one of your primary concerns. Colors should be vivid on paper as well as on transparencies; type and line art should be crisp, even at small sizes; borders between solid colors should be sharply defined, not blurred; and color gradients and blends should be smooth, with no banding.

Our panel of printer experts gave the highest marks for output to the CalComp ColorMaster Plus 6603 PS, which was closely rivaled by the HP DeskJet 1200C/PS, the Seiko Personal ColorPoint PSE, and the Tektronix Phaser 200e. (See Figure 2 for overall scores and Figure 4 for detailed results on individual types of documents.) Each of the four printers delivered excellent color vibrancy and sharp, professional-quality text and graphics. There was a slight controversy among our experts over the Tektronix printer's handling of small type sizes: Some felt that the type was a bit faint in some instances; others argued that the Tektronix Phaser 200e was the only printer we tested that didn't make small type appear unintentionally boldfaced.

Hot Color Tips

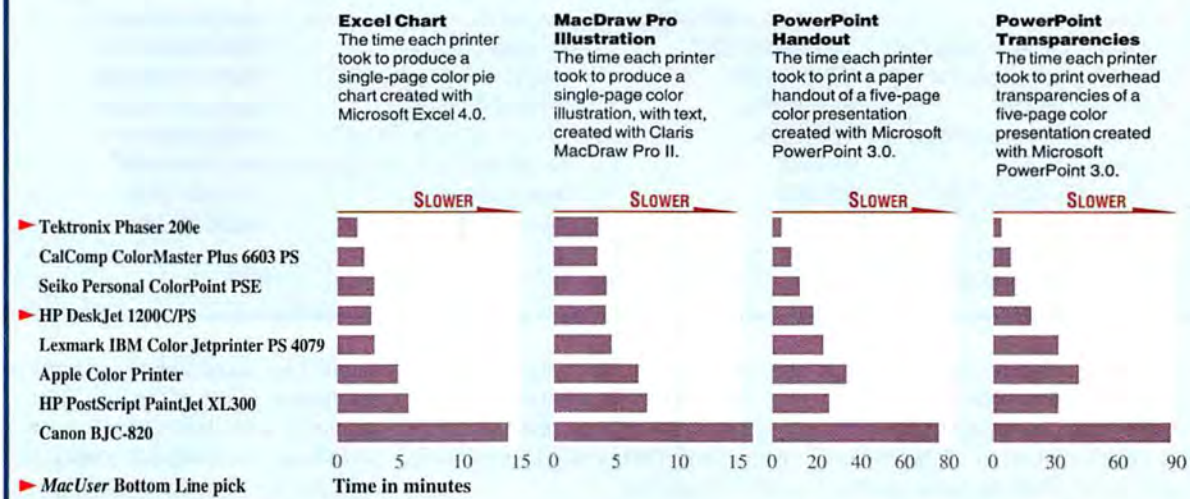
Here's some advice on getting the most from your color printer:

- If a monochrome printer is available, use it to check the position of graphics and proof the text in your color documents. You'll spot errors at a fraction of the cost of using a color printout.
- For the best results when you're printing small color text, use a single ink color: cyan, magenta, or yellow. Other colors require a mix of different-color ink dots, which can make small type unreadable.
- If you use a PostScript printer, turn off the Startup Page option. You'll save ink — and money — every time you turn on your printer.
- Don't expect your color printer to be as maintenance-free as a monochrome printer. Clean the print heads regularly, and if possible, protect your printer with a dustcover when it's not in use.
- As you work with your printer and discover the color shades that work best in your documents, create "swatch files" for each of your favorite applications. You'll minimize wasteful trial-and-error printouts.
- Those neon colors that light up your monitor screen can't help but dim when you print them. Especially vulnerable are electric blues, which fade to a dull purple on paper.

— Tony Bojorquez

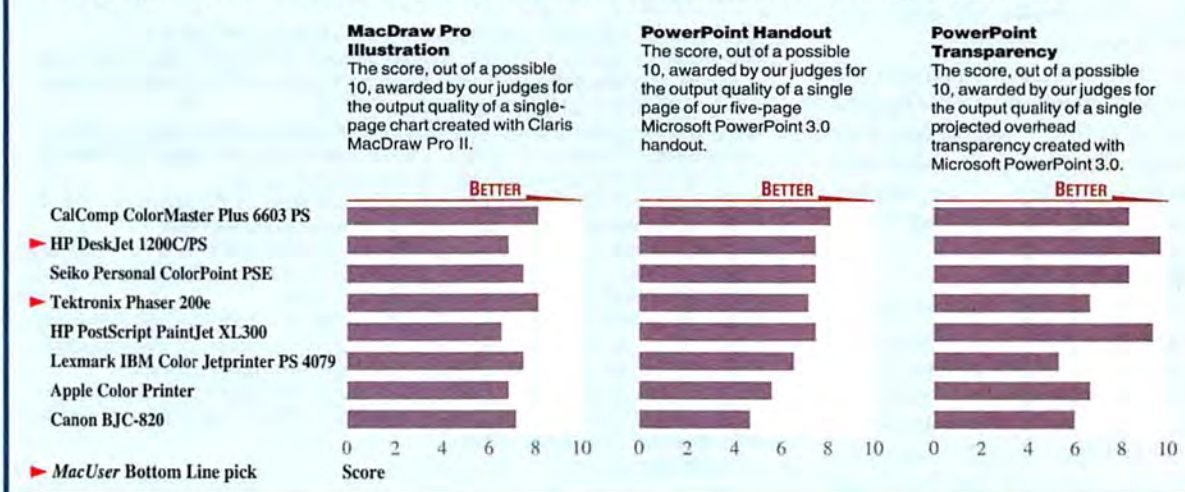
MacUser LABS Figure 3: How We Tested

Figure 3: We tested these printers on a Mac IIci with 8 megabytes of RAM, running System 7.1. We used the Mac's internal video with 256 colors on a 14-inch monitor. The only software we installed on the test platform was Adobe Type Manager 3.0 (to get the best quality for fonts on-screen). We ran our tests with AppleTalk and 32-bit addressing on and file sharing and virtual memory off. The test documents were created with a variety of typical business applications and included a mix of features designed to challenge color printers, including graduated color fills, downloadable fonts, embedded PICT images, areas of solid-black color, and small type sizes.



MacUser LABS Figure 4: Output Quality

Figure 4: To evaluate the output quality of these color office printers, we assembled a jury of MacUser Labs' graphics and printing experts to rate three documents from the set used in our timed tests. They examined the single-page MacDraw Pro illustration, a page from the five-page PowerPoint handout, and a projection of one of the PowerPoint transparencies. Judging was based on vividness and consistency of color, sharpness of small type and fine detail, "blackness" of black lines, and smoothness of blended and graduated color.



Entry-Level Color

For those who are interested in experimenting with color graphics — or who create charts and graphs solely for their own use rather than to present to clients or customers — the Hewlett-Packard DeskWriter printers are almost irresistibly affordable.

The DeskWriter C ($499 street) and the DeskWriter 550C ($739 street) are built around the same type of 300-dpi inkjet engine. The difference is that the 550C accommodates two ink cartridges — one for black ink and a second that contains cyan, magenta, and yellow inks — and the DeskWriter C has a single cartridge holder you can use for either black or color ink.

When printing graphics, these printers use the color cartridge to produce all the colors in the image — including black, which they approximate with mediocre results by combining cyan, magenta, and yellow. If a page contains text and graphics, the 550C automatically switches to the true-black ink to print text; the DeskWriter C can be set to stop between text and graphics to let you swap ink cartridges.

Text output is good with each printer, and solid-color output is reasonably vivid, especially on HP's inkjet paper. Even on this coated paper, however, heavy ink coverage causes the page to pucker and curl. Transparency output is too dull and uneven for professional presentations, and each printer is far too slow for demanding office use.

Furthermore, the three-color ink cartridge must be discarded as soon as any one of the ink colors runs out.

Drawbacks aside, the low prices of these printers make them attractive for less critical color work.

— Jim Shatz-Akin

The HP inkjet printers produced the most-impressive transparencies we saw. The DeskJet 1200C/PS was the clear winner; the PostScript PaintJet XL300 also fared well, downgraded only for a tendency toward overly dark blues. Each of the HP printers has a heating element that dries the ink as it is applied, which may account for the outstanding color. Each of the three thermal-wax printers also earned high marks for the quality of their transparencies.

You Need It *When?*

If you plan to print volumes of color documents or if you work under tight deadlines, be aware that color pages often take considerably longer to print than black-and-white ones. You'll want to give printer speed some serious thought.

Finding the fastest printer in a given price range used to be easy: For general-purpose business documents (such as the ones we used in our tests), thermal-wax printers were faster than comparable inkjet printers and PostScript color printers were faster than QuickDraw printers. Well, it's not that simple anymore.

In our two speed tests that involved printing a single page (the Excel chart and the MacDraw Pro illustration), two thermal-wax printers — the Tektronix Phaser 200e and the CalComp ColorMaster Plus 6603 PS — did lead the pack. But we were caught off guard by the HP DeskJet 1200C/PS inkjet printer, which edged out the Seiko Personal ColorPoint PSE for third place, proving that thermal-wax printing isn't always faster than inkjet printing. The QuickDraw Apple Color Printer also defied expectations: It beat the HP PostScript PaintJet XL300 in both tests.

When printing the five-page PowerPoint document on paper, the thermal-wax printers reasserted their speed advantage, taking the first three

Trends

● **Dye-sublimation printers join the affordable ranks.** Fargo Electronics has introduced the Primera Color Printer ($995 list), a 203-dpi thermal-wax color printer that you can upgrade for $249.95 to produce dye-sublimation output. Dye-sub output, which is traditionally used for continuous-tone photo proofs, requires special paper and ink ribbons.

● **"Plain paper" color becomes a reality.** The ink-fusing heaters in the Hewlett-Packard DeskJet 1200C/PS and PostScript PaintJet XL300 printers and the paper-sealing ColorCoat ribbons available for the Tektronix Phaser 200e prove that affordable, high-quality color can be achieved on plain paper. Expect other vendors to match these capabilities.

● **Color management reaches the desktop.** One of the biggest challenges in desktop color is getting colors out of the printer that match the colors you see on your Mac's screen. Several software systems are now poised to solve this problem. Apple's ColorSync system extension provides a basis for this effort, and it serves as a rudimentary color-matching tool itself. More-advanced color-management systems, including EFI's EfiColor, Kodak's ColorSense, and Light Source's OfotoColor, "plug in" to ColorSync and refine it. Early results are encouraging, but the full benefits will be realized when more applications, monitors, printers, and scanners become color-management-savvy.

— Bruce Fraser

The Primera Color Printer ($995 list), from Fargo Electronics, offers 203-dpi thermal-wax color output and an optional $249.95 dye-sublimation upgrade kit.

places easily. The PostScript inkjet printers finished ahead of the QuickDraw inkjet ones. The Canon BJC-820 took nearly an hour and a quarter to print the handout, using its default settings, so we tried adjusting it to speed things up. Switching the *dither* setting from *diffusion* to *pattern* cut the output time to 40 minutes, but the result didn't look good. (Dithering is the printing of single-colored dots next to each other to create the impression of a wide range of colors. In pattern dithering, dots are placed a uniform distance from each other, which sometimes creates noticeable bands in the printed image. Diffusion dithering eliminates this problem by randomizing the distance between dots, but it significantly increases printing time.)

When we printed our five-page document on transparency media instead of on paper, the thermal-wax printers again led the pack. Inkjet printers apply more ink to transparencies than to paper prints to ensure good color saturation, which means longer printing times. That's not the case with thermal-wax printers. The PostScript inkjet printers all printed faster than the QuickDraw inkjet ones.

It's worth noting the huge spread between the fastest and the slowest printers in this test: from less than 4 minutes to a little less than 1 hour, 26 minutes. Bear in mind also that the QuickDraw printers don't buffer pages. If you need multiple copies of

MacUSER LABS Rating Tech Support

To evaluate printer vendors' tech support, we placed blind calls to their service lines, posing as new owners of their printers who were experiencing problems. We scored each vendor's responses based on the promptness of the answers to our call; the technicians' courtesy and communication skills; and, of course, their ability to provide the correct answers.

Here are our questions and the answers we expected:

Q. My new font, Adobe Garamond, appears jagged when I print from any application. What's wrong?

A. For QuickDraw printers, Adobe Type Manager must be installed for Adobe Type 1 fonts to print smoothly. With PostScript printers, the font must be placed in the Fonts folder inside the System Folder.

Q. When I print a graphic from Microsoft Excel 4.0, the color portions come out in gray. Why can't I get color?

A. When you print a color page in Excel, in addition to checking the normal printer settings for color output, you must check a box labeled Print Using Color in Excel's Print dialog box.

Q. I've set up my new printer, but I can't find it in the Chooser.

A. For a SCSI printer, be sure the SCSI chain is properly terminated. For a printer with a LocalTalk or serial connection, make certain the printer is plugged in to the printer port rather than the modem port.

Key

Apple
Technicians were accessible at Apple's toll-free number; our longest wait was 6.5 minutes. The technicians were pleasant but answered only one question out of the three correctly and even then only after erroneously instructing us to disable antivirus utilities and reinstall the printer software.

CalComp
We had to leave messages for CalComp's technicians, who called back promptly but required the serial number from the printer before proceeding. The technicians had a helpful attitude and correctly answered two of the three questions, but they were stumped by the Chooser poser.

Canon
Canon's tech-support technicians answer the phones with admirable promptness, but we received no correct responses. One technician sighed in apparent exasperation at the mention of the Mac, and we were twice placed on hold while our adviser consulted a more-Mac-savvy colleague.

Hewlett-Packard
We were kept on hold 7 to 12 minutes before reaching HP's technicians, but once we got through, they answered all of our questions promptly and correctly. We were most impressed by their thorough technical knowledge.

Lexmark
Lexmark eventually answered all of our questions correctly, but the process was far from easy. For each call, we were asked to leave messages, and although we were called back promptly, in two cases the callers were stymied by our questions and told us to wait for a call from a Mac specialist. One of those experts took more than 24 hours to call back.

Seiko
Seiko answered its tech-support lines quickly, and although we ultimately got the correct answers to our questions, it wasn't particularly easy. One technician, although friendly, ignored several hints before reaching a correct diagnosis. A second technician, who promised to research the Excel mystery, gave the right answer the next day, but we had to call him to get it.

Tektronix
Tektronix boasted the quickest phone pickup of all the vendors we called, and its technicians were courteous and professional. They answered two of our three questions correctly but were stumped by the Excel question — possibly because their copy of the application was outdated.

a document, the increase in printing time is linear: Two copies take twice as long; ten copies take ten times as long. For multipage documents, this really mounts up. With PostScript, once the page has been rasterized, the printer can print multiple copies at its rated engine speed.

Looking at the results of our speed tests, you'll see that the Tektronix Phaser 200e was clearly the fastest printer tested by a significant margin, particularly for the five-page document printed on paper and on transparencies. The CalComp ColorMaster Plus 6603 PS was also speedy.

One of the bigger surprises was the HP DeskJet 1200C/PS, which changed our thinking about inkjet printers. The fastest inkjet printer we've ever tested, it ranked third or fourth in all the speed tests, breaking ground by beating the thermal-wax Seiko Personal ColorPoint PSE on the tests of single-page printing.

The other major surprise was the wide disparity in printing times between the Apple Color Printer and the Canon BJC-820. Both printers use the same type of engine — in fact, they look virtually identical — so any difference in speed is due to the driver software: Apple's driver clearly puts Canon's to shame.

Color Commentary

If you want to produce professional-quality business documents and transparencies, just about any of the printers we looked at can fill the bill. Each has strengths and weaknesses, of course: To decide which printer is best for you, identify the kinds of documents you'll be printing — paper or transparencies, light spot-color coverage or heavy color content — and compare speed and output-quality results for those document types in Figures 3 and 4.

The only printer we don't recommend is the Canon BJC-820, which produced mediocre output and printed extremely slowly in comparison to the other printers. The less expensive Apple Color Printer and the PostScript-compatible Lexmark IBM Color Jetprinter PS 4079 make better use of the same type of Canon engine.

The Tektronix Phaser 200e is notable both for blazing speed and for its plain-paper option. This option employs a ColorCoat ribbon, which lays down a transparent sealer on plain paper, eliminating the need for the special coated paper the other thermal-wax printers require. This process slows the printer down slightly, but it can save you a bundle on special coated paper. The ColorCoat option requires special ribbons and a special paper tray, which aren't included as standard equipment: You pay an extra $200 over the base configuration for the tray and a starter ribbon.

The Bottom Line

Nearly all the printers we tested provide good color-output quality, but if speed is your main concern, the Tektronix Phaser 200e is the printer for you. It's by far the quickest color printer we tested, thanks to a fast engine matched with a PostScript Level 2 RISC processor. It prints good-looking color output, and it offers the ColorCoat plain-paper option.

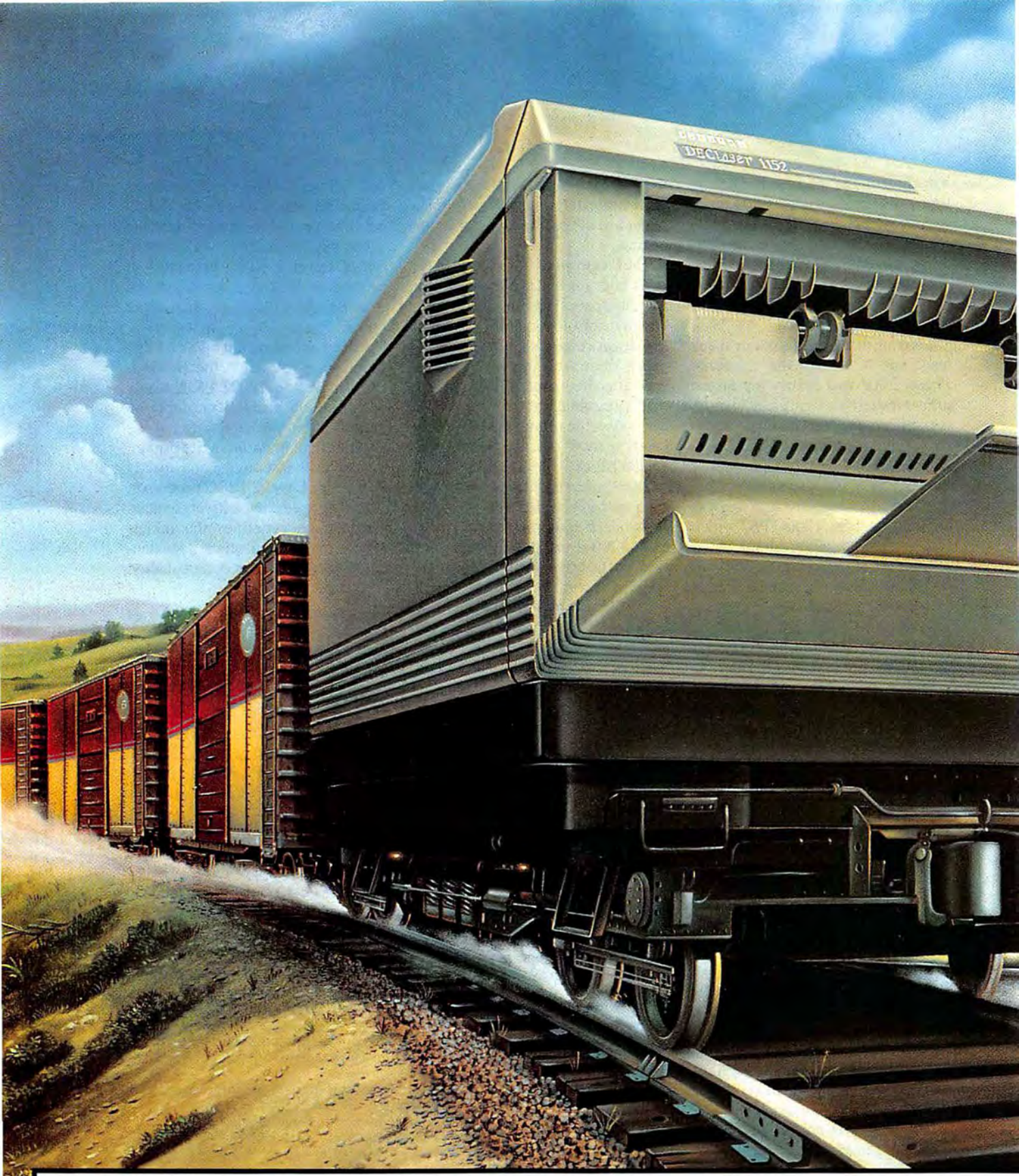
Plain-paper capability is also a distinguishing feature of the Hewlett-Packard DeskJet 1200C/PS. Not only does it produce excellent output on paper and on transparencies but it's also very quick for an inkjet printer, thanks to its fast engine and speedy PostScript Level 2 RISC processor. And it's priced competitively to boot. This printer redefines the inkjet-printer market and sets a new standard for inkjet-printer output quality.

Bruce Fraser is a *MacUser* contributing editor and all-around colorful guy. Project leader Tony Bojorquez managed the MacUser Labs testing for this report.

Table 1 Criteria

List price — The manufacturer's suggested retail price.
Street price — The average actual price charged by dealers around the U.S. in August 1993.
Processor, clock speed — The processor that powers the printer and its clock speed, in megahertz.
Ink cartridge or ribbon — Whether color is produced by liquid ink or a solid-wax ribbon and how many ink colors the printer uses.
Imaging technique — Whether the printer uses PostScript or QuickDraw to generate page images.
Emulations — Non-Mac imaging models the printer recognizes.
Automatic emulation switching — Can the printer be shared by Macs and non-Macs and accept input from all without user intervention?
RAM (standard, maximum) — The amount of memory that ships standard with the printer, and the amount the printer can accommodate, in megabytes.
Additional RAM, price — The size of memory upgrades available for the printer and their cost.
Resolution — How many dots of ink the printer can produce per inch.
Number of fonts included — The number of outline fonts shipped with the printer.
Hard-drive support — Can the printer accommodate an external hard drive for storing additional outline fonts?
Host interfaces — The types of Mac-to-printer connections.
Tray capacity — The capacity of the input tray or feeder.
Letter-sized paper, cost — The number of sheets and the cost of a package of the special coated letter paper recommended for best results with the printer.
Letter-sized transparencies, cost — The number of sheets and the cost of a package of the special transparency media recommended for best results with the printer.
Cost of ink — The cost of ink cartridges or thermal-wax ribbons.

continues ►



imagine a desktop printer designed to keep

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BFY

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CIRCLE 78 ON READER SERVICE CARD.

Table 1: Features of Color Printers

	Apple Color Printer	CalComp ColorMaster Plus 6603 PS	Canon BJC-820	▶ Hewlett-Packard DeskJet 1200C/PS
	ŧŧŧ	ŧŧŧŧ	ŧŧ½	ŧŧŧŧ½
List price	$1,659	$3,995	$2,199	$2,399
Street price	$1,550	$3,910	$1,700	$2,100
Pros	Best QuickDraw speed. Lowest price. ColorSync support.	Excellent output quality on coated paper and transparencies.	Low price. 2-year warranty.	Fastest inkjet printer. Excellent transparencies. Good plain-paper output.
Cons	Fair output quality. Transparencies must be fed manually, one by one.	Tendency toward overly dark colors.	Fair output quality. Transparencies must be fed manually, one by one.	
Hardware				
Processor, clock speed	uses Mac's processor	Intel 80960 RISC, 16 MHz	uses Mac's processor	Intel 80960SA RISC, 11 MHz
Ink cartridge or ribbon	4-color ink	3-color, 4-color, mono ribbon	4-color ink	4-color ink
Imaging technique	QuickDraw	PostScript	QuickDraw	PostScript
Emulations	NA	none	NA	HP PCL 5, HP-GL/2
Automatic emulation switching	no	yes	no	yes
RAM (standard, maximum)	NA	6 MB, 34 MB	NA	4 MB, 20 MB
Additional RAM, price	NA	18 MB, $1,495; 34 MB, $3,595	NA	1 MB, $109; 2 MB, $189; 4 MB, $279; 8 MB, $539
Print-engine technology	inkjet	thermal-wax	inkjet	inkjet
Resolution	360 dpi	300 dpi	360 dpi	600 x 300 dpi (text), 300 dpi (graphics)
Number of fonts included	64	39	none	35
Hard-drive support	no	yes	no	no
Host interfaces	parallel, SCSI	LocalTalk, parallel, serial	parallel, SCSI	LocalTalk, parallel
PostScript or clone type	NA	PhoenixPage Level 1	NA	Adobe Level 2
Dimensions (L x W x H)	52 x 41 x 16.9 in.	23 x 17.6 x 16 in.	52 x 41 x 16.9 in.	19.1 x 16.9 x 11.1 in.
Weight	22 lb	55 lb	22 lb	29 lb
Media handling				
Paper sizes	letter, legal, 11 x 17 in., A4, A3, #10 env.	letter, A4	letter, legal, 11 x 17 in., A4, A3, #10 env.	letter, legal, A4
Printable area (letter-sized paper)	9.52 x 9.63 in.	8.1 x 10.61 in.	8 x 10.4 in.	8.16 x 10.66 in.
Tray capacity	100 sheets (letter, A4), 50 sheets (legal, 11 x 17 in., A3), 5 #10 env.	100 sheets	100 sheets (letter, A4), 50 sheets (legal, 11 x 17 in., A3), 5 #10 env.	180 sheets, 100 transparencies
Supplies				
Letter-sized paper, cost	200 sheets, $20	300 sheets, $34	200 sheets, $19	50 glossy sheets, $59.95
Letter-sized transparencies, cost	50 sheets, $50	100 sheets, $99	50 sheets, $50	50 sheets, $55.95
Cost of 3-color ribbon, # of prints	NA	$97, 250 prints	NA	NA
Cost of ink	black, $25; CMY, $35 ea.	NA	black, $25; CMY, $34 ea.	black, $29.95; CMY, $34.95 ea.
Warranty	1 year	1 year	2 years	1 year
Company	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 800-776-2333 408-996-1010 512-908-8135 (fax)	CalComp Graphics Group 2411 W. La Palma Ave. Anaheim, CA 92801 800-445-6515 714-821-2000 714-821-2714 (fax)	Canon Computer Systems 123 E. Paularino Ave. Costa Mesa, CA 92625 800-848-4123 714-438-3000 714-438-3099 (fax)	Hewlett-Packard P.O. Box 58059, MS11L-SJ Santa Clara, CA 95051 800-752-0900 619-487-4100 208-344-4809 (fax)

▶ *MacUser* Bottom Line pick

In the dog-eat-dog world of business presentations, we just made you a pit bull with the legs of a greyhound.

In dog racing as in business, if you're not leading the pack, the view seldom changes. Meet your new leg up on the competition: the Tektronix Phaser™ 200 color printer. It's lean, mean, and very very fast. Of course, you don't have to take our word for it, *PC Computing* magazine just called it the best overall presentation printer in the business. So much for the other guys.

But what is it that makes the Phaser 200 so good? For starters, the ink coverage and image quality are, in a word, brilliant. We at Tektronix didn't get to be the award-winning leader in color printers by sitting on our hands. Then there's speed. You get all of this great color at two pages per minute, which is nearly as fast as a regular black and white printer. Can you say increased productivity?

On top of all this, the Phaser 200 is a work group printer that gives you the advantages of a laser printer. Including true Adobe® PostScript™ Level 2, networkability, separate paper and transparency trays and price (did we happen to mention the Phaser 200 has a list price of only $3,695?).

For more information or a free output sample, come into your nearest Tektronix dealer or call us at 800/835-6100, Dept. 31A. For faxed information, call 503/682-7450, and ask for document # 5001.

In closing, we just want to remind you that your competition is also reading this ad. And they're extremely hungry. So when choosing a presentation printer, the choice is quite simple. You can either eat, or be eaten. Bon appétit.

Tektronix

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CIRCLE 122 ON READER SERVICE CARD.

Table 1: Features of Color Printers, continued

	Hewlett-Packard PostScript PaintJet XL300 ★★★½	Lexmark IBM Color Jetprinter PS 4079 ★★★	Seiko Personal ColorPoint PSE ★★★½	▶ Tektronix Phaser 200e ★★★★½
List price	$3,995	$3,199	$2,999	$3,695
Street price	$3,025	$2,895	$2,675	$3,465
Pros	Excellent transparencies.	On-site warranty. Excellent documentation.	Most affordable thermal-wax printer tested.	Fastest printer tested.
Cons	Slowest PostScript printer tested. Tendency toward overly dark colors.	Highest-quality mode extremely slow. Transparencies must be fed manually, one by one.	Maximum print area on 8.5 x 11 in. is 8.1 x 8.6 in.; larger area requires 8.5 x 14 in. sheets.	Plain-paper option requires $200 upgrade.
Hardware				
Processor, clock speed	Intel 80960 RISC, 9.98 MHz	AMD 29200, 16 MHz	Intel 80960 RISC, 16 MHz	AMD 29000 RISC, 16 MHz
Ink cartridge or ribbon	4-color ink	3-color ink	3-color, 4-color, mono ribbon	3-color ribbon
Imaging technique	PostScript	PostScript	PostScript	PostScript
Emulations	HP PCL 5, HP-GL/2	IBM GL	HP-GL	HP-GL
Automatic emulation switching	yes	yes	yes	yes
RAM (standard, maximum)	6 MB, 18 MB	4 MB, 16 MB	5 MB, 21 MB	4 MB, 8 MB
Additional RAM, price	1 MB, $109; 2 MB, $189; 4 MB, $279; 8 MB, $539	4 MB, $299; 8 MB, $499	4 MB, $600	4 MB, $495
Print-engine technology	inkjet	inkjet	thermal-wax	thermal-wax
Resolution	300 dpi	360 dpi	300 dpi	300 dpi
Number of fonts included	35	35	39	17
Hard-drive support	no	no	yes	no
Host interfaces	LocalTalk, parallel, serial	LocalTalk, parallel, serial	LocalTalk, parallel, serial	AppleTalk, parallel, serial
PostScript or clone type	Adobe Level 2	PhoenixPage Level 1	PhoenixPage Level 1	Adobe Level 2
Dimensions (L x W x H)	30 x 20 x 10 in.	20.5 x 16 x 6.7 in.	17.6 x 15.9 x 6.3 in.	18 x 13 x 11 in.
Weight	45 lb	22 lb	39 lb	40 lb
Media handling				
Paper sizes	letter, legal, 11 x 17 in., A4	letter, legal, 11 x 17 in., A4, A3, B5, exec., #10 env., DL env.	letter, legal, A4, B4	letter
Printable area (letter-sized paper)	8.16 x 10.66 in.	9.52 x 9.63 in.	8.1 x 8.6 in.	8.1 x 10.6 in.
Tray capacity	200 sheets	100 sheets (letter, A4), 50 sheets (legal, 11 x 17 in., A3), 5 #10 env.	100 sheets	100 sheets, 50 transparencies
Supplies				
Letter-sized paper, cost	50 glossy sheets, $59.95	200 sheets, $21.50	2,000 sheets, $120	1,000 sheets, $80
Letter-sized transparencies, cost	50 sheets, $55.95	50 sheets, $50	100 sheets, $72	1,000 sheets, $1,120
Cost of 3-color ribbon, # of prints	NA	NA	$263, 525 prints	$165, 342 prints
Cost of ink	black, $22.95; CMY, $25.95 ea.	black, $24.75; CMY, $34.75 ea.	NA	NA
Warranty	1 year	1 year on-site	1 year	1 year
Company	Hewlett-Packard P.O. Box 58059, MS11L-SJ Santa Clara, CA 95051 800-752-0900 619-487-4100 208-344-4809 (fax)	Lexmark International 740 New Circle Rd. N.W. Lexington, KY 40511 800-438-2468 606-232-3000 606-232-5439 (fax)	Seiko Instruments 1130 Ringwood Ct. San Jose, CA 95131 800-888-0817 408-922-5900 408-433-3246 (fax)	Tektronix 26600 S.W. Pkwy. Wilsonville, OR 97070 800-835-6100 503-682-7370 503-682-2980 (fax)

▶ *MacUser* Bottom Line pick

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CIRCLE 117 ON READER SERVICE CARD.

Bigger, Better POWERBOOK Hard Drives

Has your life outgrown your laptop? Here are ten hard drives that expand your PowerBook, on the inside. **BY MARK FROST**

PHOTOGRAPHY: FRED STIMSON

FACE IT, Rolodexes, date books, and applications seldom get smaller with the passage of time. What seemed like a reasonable amount of hard-disk space back when you got your PowerBook now looks woefully inadequate. Drive manufacturers, as always, have responded by packaging ever-more-capacious drives to fit inside your PowerBook.

We got our hands on a few such drives, which can store 160 to 340 megabytes. They generally aren't any faster than the standard Apple Quantum GO80S internal drive, nor do they consume much more battery power. The important factors to consider before you buy one are how much the drive will cost you, how you'll get it into your PowerBook, and what to do with your old drive.

Macintosh
PowerBook 160
esc
delete
return
enter
shift

An external hard drive is a mechanism in a case with a power supply and various buttons, cables, and connectors. For internal storage, on the other hand, you're buying a bare hard-drive mechanism. Although the internal products all look quite similar, the quality of the accompanying formatting software, installation instructions, and warranty can make a big difference.

Speaking of warranty, take a quick look at the one that covers your PowerBook — if it's still in effect, don't even think about installing a new internal hard drive yourself. If you crack open that PowerBook, your Apple warranty will be history. Instead, concentrate on vendors that offer installation, or locate your local Apple authorized service center by calling 800-767-2775 and check the cost of having someone there install the drive for you, thus leaving your Apple warranty intact.

Regardless of the state of your warranty, think hard before you open up your PowerBook. Hard-drive installation in a PowerBook — particularly a Duo — is a *very* delicate operation. If you're nerdy enough for the task, however, look for a drive that comes with thorough installation instructions. (For some suggestions about what to do with your old PowerBook drive, check out the "External Solutions" sidebar.)

At a Glance

▶ APS Quantum GRS 160	$$$$
▶ APS T 340	$$$$
APS T 213	$$$½
ClubMac Seagate 2.5"	$$$
FWB hammerPB210	$$$
MacFriends Quickor 213	$$$
MacProducts Magic 213MB Portable	$$$
Microtech Roadrunner 200i	$$$
Procom ATOM200-PB	$$$
Procom ATOM340-PB	$$$½

▶ *MacUser* Bottom Line pick

Initially, only Quantum produced mechanisms for vendors to use in replacement PowerBook drives. As you might expect, single-supplier markets generally don't have the most attractive pricing. Fortunately Fujitsu, IBM, Seagate, and Toshiba have entered the fray with mechanisms of their own, which should force prices down.

We tested some currently available mechanisms as they ship in drives from APS, ClubMac, FWB, MacFriends, MacProducts, Microtech, and Procom. We also looked at a preproduction drive from ClubMac that is based on a new mechanism from Fujitsu. Although the speed differences among mechanisms were slight, what you get from the various vendors differs significantly.

What You Get

The first thing to look for when you open your box is a packing list that lets you know what you should find in the package. You should also receive comprehensive documentation on how to install the drive and use the formatting software. Most of these vendors opt not to include installation instructions, claiming the job should always be done by an authorized service center. Although this may be true, we believe the instructions should be included for those who are foolish or skilled enough to try it themselves.

APS and Procom offered the best documentation for do-it-yourselfers. The APS manual not only offers lucid instructions but also backs them up with equally lucid photos and illustrations to make the process as easy as possible. (Both companies warn you that opening the PowerBook voids your Apple warranty.)

FWB offers little in terms of installation instructions, instead recommending you have your dealer install the drive for you — good advice. The documentation for FWB's superior Hard Disk ToolKit formatter is about as good as it gets, however.

MacFriends has the dubious honor of offering the worst documentation of the bunch: none. Not only did the company neglect to include a packing list but it also offered no installation instructions and no manuals whatsoever. Help is built in to the MacFriends drive's software, but that would do you no good if the application were corrupt to begin with. The lack of any documentation might be acceptable if the MacFriends drive were less expensive than all the others, but the APS drive based on the exact same Toshiba mechanism sells for about $120 less.

As for the installation itself, the drives based on the Toshiba mechanisms are just a little taller than the

External Solutions

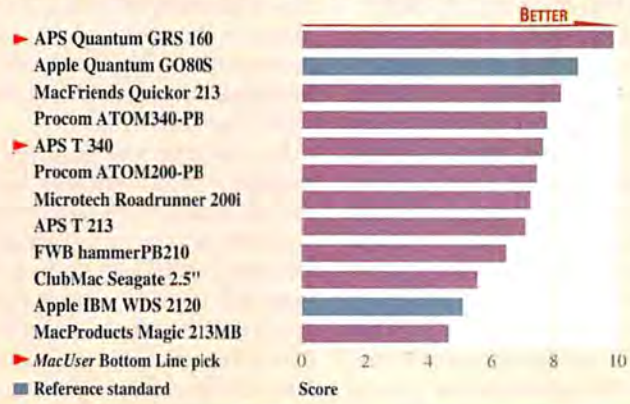
Getting a higher-capacity internal drive for your PowerBook may have solved today's storage needs — but what about tomorrow's? You can fit only one drive in your PowerBook at a time. Well, either you find a way to keep using your old internal drive or you get another drive to use externally.

Getting a battery-powered external case for your old PowerBook drive is your best bet for taking advantage of it. Many hard-drive vendors offer such products for around $150. These smallish cases give you the freedom to carry less important applications or data or even a large presentation that might not fit on your internal drive's disk.

Although you can't put your old 2.5-inch drives into it, the Powerbox, from Adambyte (415-988-1415), does let you carry along oodles of extra storage and even a backup device, if you so desire. The Powerbox comes with either a 200-megabyte or a 500-megabyte hard drive and either a Teac tape or a Floptical drive installed. The box, which has the same footprint as a PowerBook, is powered by a standard PowerBook battery and can act as a battery charger when plugged in to a wall outlet.

LABS Figure 1: Overall Performance

Figure 1: We combined the results of all our timed tests — placing particular emphasis on spinup time and battery life — to arrive at an overall score for each PowerBook internal hard drive. The highest possible score was 10.



original PowerBook drives, so the latch on the original bracket doesn't quite fit over the replacement drives. But the mounting screws do hold the mechanism firmly in place.

Beating the System

The PowerBook 160, 165c, 180, and 180c and the Duos require System 7.1 to operate. The latest system version licensed by Apple to drive vendors is System 7.0.1, however, so we were concerned when we saw that the MacFriends Quickor 213 actually comes with System 7.1 installed. All the other drives — except the Procom ATOM200-PB and ATOM340-PB, which have *no* system software installed — come with System 7.0.1 installed.

What all this means is that you must hold on to the system disks that came with your PowerBook, because you'll have to reinstall the system from these disks onto the new internal drive you just bought. If you need to reformat the drive and you've never done this before, you'll be in the best shape with the APS and FWB drives, mainly because of their superior documentation. The ClubMac drive we tested included a version of SCSI Director (2.2.1) that couldn't handle the PowerBook's Sleep mode: Every time the PowerBook went to sleep, SCSI Director 2.2.1 thought the drive had dropped off the SCSI chain. SCSI Director 2.2.1 would then post an error message. Clearly, this formatter was not designed with the PowerBook in mind. As we went to press, SCSI Director Pro 3.0 started shipping, so look for this version from the vendor before you buy.

Crank It Up

If you hate waiting for your PowerBook, perhaps the most important issue is how long it takes for the drive to get up and spinning, particularly if it goes to sleep frequently. Once the drives were installed, we timed how long it took them to spin up to operating speed (see Figure 2). All ten drives took between four and seven seconds.

The preproduction ClubMac Fujitsu 230 (not charted) took a full ten seconds to reach its operating speed, probably because its mechanism spins at a faster rate than those of the other drives — ten seconds is a long time to wait if your drive goes to sleep frequently. The Fujitsu mechanism proved to be even more problematic, though: It required more

Trends

The current crop of PowerBook internal hard drives provides higher capacity but not much in the way of speed. If you need a faster drive, remember that good things come to those who wait.

- **Big drives will get bigger, but probably not much faster for a while.** PowerBook drives will have higher capacities, but because of power conservation, speed will probably not improve as quickly. The new Quantum Go•Drive GLS 170 boasts only slightly higher speed than the existing Quantum Go•Drive GRS 160. The real excitement in capacity gains seems to be coming from Toshiba. As we went to press, Toshiba announced the addition of a 520-megabyte, 2.5-inch mechanism to its family of notebook-drive mechanisms.
- **Look for higher data density.** IBM's AdStar division recently announced that it is developing a new media formula in conjunction with magneto-resistive heads to dramatically increase data density. Higher density means not only higher capacity but also higher sustained-throughput rates, because more data can pass under the heads in a single turn of the platters.
- **Future drives may have no platters at all.** Quantum has entered into an alliance with Silicon Storage Technology, which manufactures PCMCIA flash-memory products. Flash-memory devices are much faster than hard drives, but flash memory isn't as popular, because of its high cost per megabyte and short life span. Look for Quantum, along with other hard-drive-mechanism manufacturers such as Seagate Technologies and Digital, to bring to flash-memory products the same error-correction technology they've been using in hard drives. The result will be RAM-based drives that are as secure as hard drives. Because most flash-memory manufacturers create modules that use PCMCIA, it's a good bet Apple will be integrating PCMCIA slots into its products in the future.

power at spinup than the PowerBook's standard AC power supply could provide. The mechanism worked fine on battery power alone or with both the battery *and* the AC power supply.

What About Speed?

We all want faster computing: Every second spent waiting for your Mac to do something can seem an eternity. Unfortunately, although they all offer greater capacity, this crop of PowerBook drives is not likely to ease your need for speed. We ran two speed tests to see what you can expect from these drives. The Finder, like most applications, moves data in small chunks (16K at a time). Drives with efficient caching algorithms tend to do best at moving data this way, and the APS Quantum GRS 160, the only drive to beat the Apple Quantum GO80S in our Finder test, led the way. The ClubMac Seagate 2.5" was the least efficient at doing small-block transfers, although what it lacked in speed, it made up for in energy efficiency.

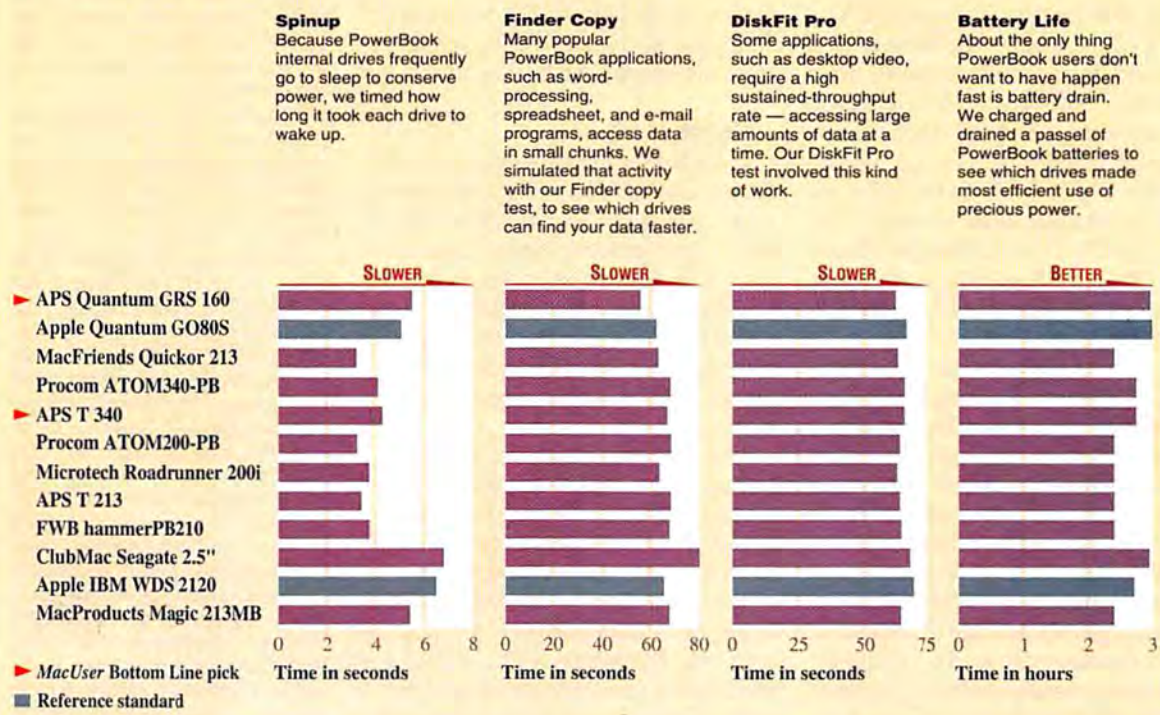
When people discuss storage technology — hard-disk drives, floppy-disk drives, CD-ROM drives, and so on — you may hear the phrase *sustained throughput* thrown around quite a bit. But only a few applications really take advantage of a high sustained-throughput rate, the maximum rate at which data can be pumped into and out of a drive on a sustained basis. Digital video relies on a high sustained-throughput rate, and so do backup programs such as DiskFit Pro.

Usually, when you're looking at hard drives of the same capacity, those that spin their platters faster have higher sustained-throughput rates. When you're looking at a range of capacities, the higher-capacity drives typically have higher sustained-throughput rates. This is because, in the same amount of time, drives with a high data density pass more data under the heads than drives with a low data density.

Because many of the applications popular with PowerBook users — such as e-mail, word-processing, and spreadsheet programs — are not disk-intensive, speed may not be as big an issue as it is with a desktop machine. Battery life is a bigger concern among PowerBook users, so we looked at how efficient these drives are with your battery's limited resources. Our tests showed a significant difference

MacUser LABS Figure 2: Drive Times — More Space at the Same Pace

Figure 2: In order to find out how these internal hard drives would perform in the real world, we installed each drive in a PowerBook 180 with 14 megabytes of RAM, running System 7.1. We turned 32-bit addressing and AppleTalk on and the RAM disk and virtual memory off.



in the drives' effects on battery life. The APS Quantum GRS 160 and the ClubMac Seagate 2.5" were the most miserly with power. The drives based on the Toshiba MK2224FB mechanism — the APS T 213, FWB hammerPB210, MacFriends Quickor 213, MacProducts Magic 213MB Portable, Microtech Roadrunner 200i, and Procom ATOM200-PB — were the least efficient in terms of energy use.

You're going to pay some serious simoleons for a new drive, so it's not unreasonable to expect such things as a money-back guarantee; free installation service; and toll-free, knowledgeable tech support.

We checked each package for signs of after-sale support and then called each vendor's tech-support line to see what help was available. MacFriends took top honors in overall support by offering a 30-day money-back guarantee, free installation, and a knowledgeable — albeit frustratingly difficult-to-reach — tech-support staff. Microtech's support was also excellent, with a two-year warranty, knowledgeable tech-support staff, and free data recovery. MacProducts brought up the rear, offering a money-back guarantee, installation for a fee, and not much else. Check our "Rating Tech Support" sidebar for a glimpse into how these companies handled user problems.

The Bottom Line

If you're on a limited budget, the APS Quantum GRS 160 is your best bet, offering complete installation instructions and selling at a rock-bottom price. If you want more storage space and can afford the extra cost, go for the APS T 340. Higher capacity and improved energy efficiency make this a better drive than those based on the Toshiba MK2224FB mechanism.

MacUser **senior editor Mark Frost is all over storage like a big dog. ZD Labs project leader Kristina De Nike managed the testing for this report.**

MACUSER LABS Rating Tech Support

To find out exactly how these companies stand behind their PowerBook internal hard drives, we called each vendor, posing as typical users with typical problems. Here's what we asked and the answers we expected:

Q. I've installed the drive and the PowerBook is making the startup sound, but the screen is dark.
A. You didn't plug the ribbon cable in when you put the PowerBook back together.

Q. I'm trying to start up my PowerBook 180, and I keep getting a message saying I can't boot off System 7.0.1.
A. You need to install System 7.1 from the floppy disk that came with your PowerBook.

Key

APS

The APS tech-support voice-mail system gives you the option of leaving a message or staying on hold. We had problems with busy signals, although we didn't have to stay on hold very long once we got through. The representatives had no problem answering both questions promptly and politely.

ClubMac

ClubMac's tech support was uneven: The technician did well on the first question but exhibited only limited knowledge of the PowerBook on the second question and seemed to want to use the call to sell another product rather than solve the problem at hand.

FWB

The FWB representative answered the second question correctly and just missed solving the first problem, suggesting that something inside the PowerBook might be rubbing against the video connector.

MacFriends

MacFriends was the only company with which we had to leave messages. One person to whom we were forwarded had a full voice-mail box. The technicians did not leave messages when they called us back. When we finally did get through, the technicians were capable and had no problems with our questions. One of them explained that the department was temporarily shorthanded. These people were so helpful on the phone that it almost canceled out the frustration of reaching them.

MacProducts

MacProducts tech support was fairly easy to reach, and the representatives did well on the first question. But they fumbled on the second. A technician went so far as to say we should be able to run System 6.0.5 on a PowerBook (wrong!).

Microtech

It was easy to get through to Microtech tech support. The technicians missed the first question by guessing that the RAM had been knocked out of its slot during installation but answered the second question easily.

Procom

Tech support almost solved the first question but ultimately dismissed it as our problem, because we had installed the drive ourselves rather than going to a certified technician. No problems with the second question. The representative claimed not to support the PowerBook 180, however, because he didn't have one to test.

continues ►

Table 1: Features of PowerBook Hard Drives

● = yes ○ = no	▶ APS Quantum GRS 160 $$$$	APS T 213 $$$½	▶ APS T 340 $$$$	ClubMac Seagate 2.5" $$$	FWB hammerPB210 $$$
List price	$299	$469	$659	$499	$799
Street price	$299 (direct)	$469 (direct)	$659 (direct)	$499 (direct)	$645
Pros	Good documentation, installation instructions, and formatter. Antistatic strap. Money-back guarantee.	Good documentation, installation instructions, and formatter. Antistatic strap. Money-back guarantee.	Good documentation, installation instructions, and formatter. Antistatic strap. Money-back guarantee.	Money-back guarantee.	Good documentation. Includes CPU software. Good formatter.
Cons		Not as energy-efficient as drives based on the Toshiba MK2326FB.		Minimal formatter.	No money-back guarantee. Not as energy-efficient as drives based on the Toshiba MK2326FB.
Hardware					
Mechanism	Quantum Go•Drive GRS 160	Toshiba MK2224FB	Toshiba MK2326FB	Seagate ST9235N	Toshiba MK2224FB
Advertised, formatted capacity	160 MB, 158.9 MB	213 MB, 201 MB	340 MB, 322.7 MB	200 MB, 197.8 MB	210 MB, 201 MB
Antistatic strap included	●	●	●	○	○
Software					
Formatter	APS Power Tools	APS Power Tools	APS Power Tools	SCSI Director	Hard Disk ToolKit
Partitioning	●	●	●	●	●
Backup	●	●	●	○	○
Password protection	●	●	●	○	●
Encryption	○	○	○	○	●
File recovery	○	○	○	○	○
Optimizer	○	○	○	○	○
Other					
Warranty	1 year	1 year	1 year	1 year	1 year
30-day money-back guarantee	●	●	●	●	○
Toll-free tech support	●	●	●	○	○
Guaranteed turnaround	○	○	○	○	●
Installation service	○	○	○	○	○
Company	APS 6131 Deramus P.O. Box 4987 Kansas City, MO 64120 800-233-7550 816-483-6100 816-483-4563 (fax)	APS 6131 Deramus P.O. Box 4987 Kansas City, MO 64120 800-233-7550 816-483-6100 816-483-4563 (fax)	APS 6131 Deramus P.O. Box 4987 Kansas City, MO 64120 800-233-7550 816-483-6100 816-483-4563 (fax)	ClubMac 7 Hammond Irvine, CA 92718 800-258-2622 714-768-8130 714-768-9354 (fax)	FWB 2040 Polk St. Ste. 215 San Francisco, CA 94109 415-474-8055 415-775-2125 (fax)

▶ *MacUser* Bottom Line pick

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Table 1: Features of PowerBook Hard Drives, continued

● = yes ○ = no	MacFriends Quickor 213 ŧŧŧ	MacProducts Magic 213MB Portable ŧŧŧ	Microtech Roadrunner 200i ŧŧŧ	Procom ATOM200-PB ŧŧŧ	Procom ATOM340-PB ŧŧŧ½
List price	$899	$619	$759	$795	$1,195
Street price	$590	$619 (direct)	$730	$640	$920
Pros	Good service and support. Money-back guarantee.	Money-back guarantee.	Formatter has instant help. Two-year warranty.	Good documentation.	Good documentation.
Cons	No documentation. Not as energy-efficient as drives based on the Toshiba MK2326FB.	Not as energy-efficient as drives based on the Toshiba MK2326FB.	No money-back guarantee. Not as energy-efficient as drives based on the Toshiba MK2326FB.	Drive comes blank. No money-back guarantee. Not as energy-efficient as drives based on the Toshiba MK2326FB.	Drive comes blank. No money-back guarantee.
Hardware					
Mechanism	Toshiba MK2224FB	Toshiba MK2224FB	Toshiba MK2224FB	Toshiba MK2224FB	Toshiba MK2326FB
Advertised, formatted capacity	213 MB, 201 MB	210 MB, 201 MB	200 MB, 201 MB	200 MB, 201 MB	340 MB, 322.7 MB
Antistatic strap included	○	○	○	○	○
Software					
Formatter	Quickor Formatter	Anubis	PBTools	Procom Installer	Procom Installer
Partitioning	●	●	●	●	●
Backup	● (HD Backup)	○	○	○	○
Password protection	○	●	●	●	●
Encryption	○	○	○	○	○
File recovery	○	○	●	○	○
Optimizer	○	○	○	○	○
Other					
Warranty	1 year	1 year	2 years	1 year	1 year
30-day money-back guarantee	●	●	○	○	○
Toll-free tech support	●	○	●	●	●
Guaranteed turnaround	●	○	●	○	○
Installation service	●	●	○	●	●
Company	MacFriends 8235 N. Mancover Portland, OR 97217 800-331-1322 503-286-9350 503-286-8710 (fax)	MacProducts 608 W. 22nd St. Austin, TX 78705 800-622-8721 512-476-5295 512-499-0889 (fax)	Microtech 158 Commerce St. East Haven, CT 06512 800-626-4276 203-468-6223 203-468-6466 (fax)	Procom 2181 Dupont Dr. Irvine, CA 92715 800-800-8600 714-852-1000 714-852-1221 (fax)	Procom 2181 Dupont Dr. Irvine, CA 92715 800-800-8600 714-852-1000 714-852-1221 (fax)

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700MB	$739	~~$979~~	$799
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80MB	$179	~~$299~~	$279
160MB HOT!	$259	~~$399~~	$359
213MB	$459	~~$599~~	$559
340MB NEW!	$659	~~$759~~	$759

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40MB		$239
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- Internal termination does not meet SCSI specifications.
- Moving drives requires reconfiguration of the SCSI chain, some models must be last in SCSI chain.
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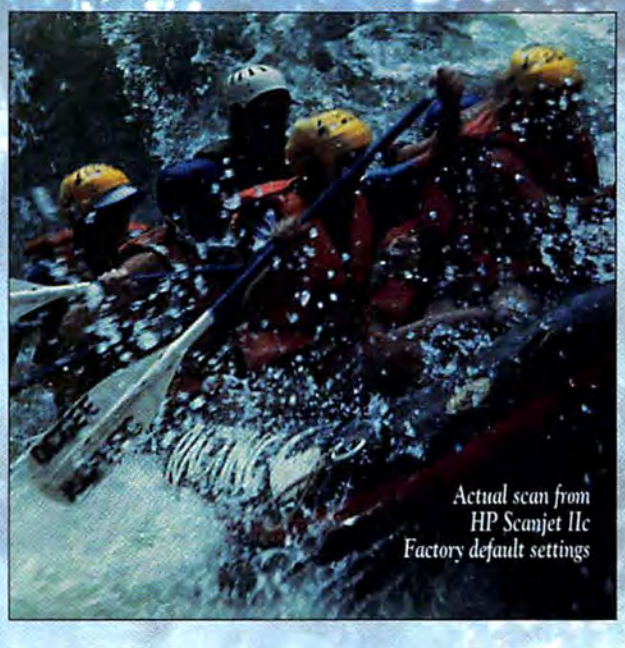
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From Peter Norton, the leader in Macintosh utilities.

To learn more, dial FAST FAX 1-800-554-4403 and select option 1, document 411. (For information on easy network installation, choose option 1, document 481.) Better yet, pick up Norton Utilities at your local dealer for about $149.*

You should probably do it today, though. Before your luck runs out.

THE NORTON UTILITIES FOR MACINTOSH
SYMANTEC.

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THE BIG SQUEEZE

When you've got more data than space for it, when you can't afford to buy a storage device, it's time to get small: Get automatic-compression software. **BY JIM SHATZ-AKIN**

LET'S FACE IT: Mac hard-disk space is precious real estate. And thanks to large, high-resolution graphics files and QuickTime movies and a preponderance of everyday word-processing and spreadsheet files, that space is increasingly scarce.

The promise of doubling your hard-disk capacity by using an automatic-compression program sounds great, particularly when compared to the alternative: Even though the prices of storage devices continue to drop, a new drive still costs a good deal more than the $40-to-$90 street price of a compression utility.

But is automatic compression too good to be true? Is it safe? How does it affect system performance? To find out, we looked at eight compression programs. Five of them — AutoDoubler 2.0.1, from Fifth Generation Systems; More Disk Space 2.2, from Alysis Software; Now Compress 1.0, from Now Software; and StuffIt Deluxe 3.0.5 and StuffIt SpaceSaver 1.0.5, both from Aladdin Systems — compress data on a file-by-file basis. The other three — eDisk 1.0, from Alysis Software; Stacker for Macintosh 1.0, from Stac Electronics; and TimesTwo 1.03, from Golden Triangle Computers — compress data at the disk-driver level.

All these programs perform *lossless* compression, which preserves all the information in the original data. (This differs from the *lossy* approach, such as with JPEG image compression, in which expendable data is identified and discarded.) Lossless compression squeezes data into less space by reducing redundancy: An electronic version of this magazine might be compressed by the replacement of all but the first instance of the word *Macintosh* with a much shorter marker that points to the original word. Decompression reconstitutes data by replacing each marker with the original.

The efficiency of the lossless style of compression depends on the extent of redundancy within the original data: A file containing highly random data, such as an audio clip of white noise, probably wouldn't compress at all, whereas a file containing an illustration that has lots of white space might shrink by as much as 90 percent.

At a Glance

▶ Stacker for Macintosh 1.0	★★★★
▶ StuffIt SpaceSaver 1.0.5	★★★★
AutoDoubler 2.0.1	★★★½
eDisk 1.0	★★★
More Disk Space 2.2	★★½
Now Compress 1.0	★★★½
StuffIt Deluxe 3.0.5	★★★★½
TimesTwo 1.03	★★★

▶ *MacUser* Bottom Line pick

File and Driver

File-level- and driver-level-compression programs compress data in different ways. Which way is better for you? If you'd like to reduce the space all the data on your hard disk occupies without having to think about it, driver-level compression is the way to go. If you prefer to have precise control over which items are compressed and which are not, look at a file-level program.

Driver-level compression operates at the same level as the disk driver, the software that directs transmission of data to and from your hard disk and keeps a map of where the data resides. The compressor intercepts the data before it is written to disk, compresses it, and takes over the driver's data-mapping duties. In turn, it fools your Mac's operating system by portraying the hard disk as roughly twice its actual size: The Finder reports that your 80-megabyte disk has a capacity of 160 megabytes, for example. All data written to a driver-compressed volume is compressed as it's written and is decompressed as it is read back.

Driver-level products capture additional disk space by circumventing the Mac's minimum allocation-block size. On an 80-megabyte disk containing noncompressed data, files are stored in 512-byte blocks: A 5,120-byte file occupies 10 blocks; adding just a single extra byte requires an 11th block, wasting 511 bytes of space. Driver-level compressors eliminate this waste by creating variable-sized allocation blocks.

File-level compression takes a different tack, operating on individual files and folders. When you install a file-level-compression program, it asks you to specify which volumes, folders, and files you wish to

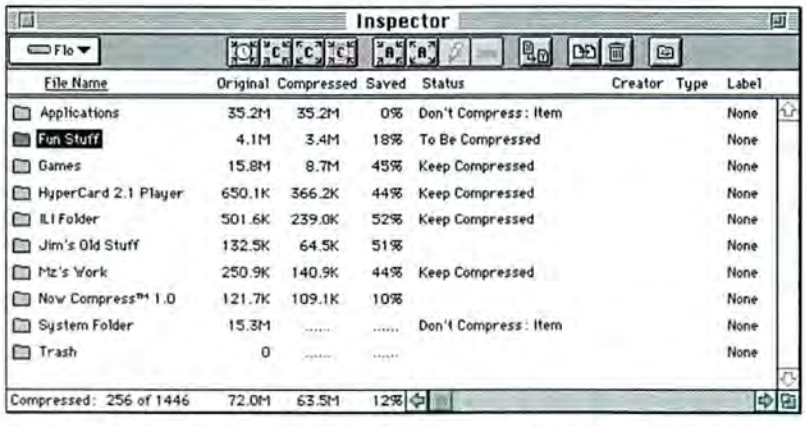


Figure 1: Now Compress' Inspector window tells you which items on your disk are compressed and by what percentage, even if the data has been compressed by another utility. It also provides great flexibility in specifying which items should be compressed.

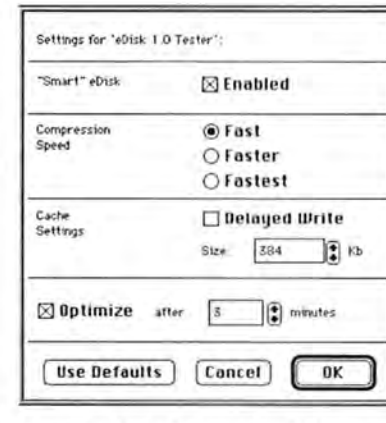


Figure 2: Alysis Software's eDisk, the only configurable driver-level compressor we tested, offers numerous compression options.

compress — or to exclude from compression. You also specify when you want the software to compress your files — after your Mac has been idle for a certain number of minutes or at a particular time.

This process is similar to on-demand archival compression, in which individual files or folders are shrunk into a single compressed file for efficient storage or transmission across phone lines. Four of the programs we tested — More Disk Space, Now Compress, StuffIt Deluxe, and StuffIt SpaceSaver — offer on-demand archival compression in addition to freeing up disk space automatically. But be aware that the algorithms they use for automatic compression are distinctly different from those they use for archival purposes: Automatic-compression algorithms are faster than on-demand techniques, but they compress data less efficiently.

Let's Get Small

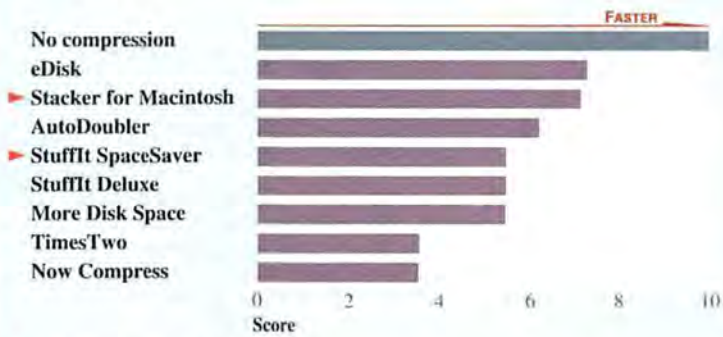
We began our evaluation of compression products by considering their ease of installation, which every vendor strongly urges should begin with a full backup of the disk containing the files you want to compress (see the "Compression Tips" sidebar). Once you've completed that chore, it's time to load the software. File-level compressors make this task

Figure 3: Finder menus, such as this one provided by StuffIt SpaceSaver, are also available in StuffIt Deluxe, More Disk Space, and Now Compress. They let you configure automatic compression easily and are used by these file-level compressors to direct on-demand archival compression.

LABS Figure 4: How We Tested

Figure 4: We measured the time required to launch three applications — Microsoft Word 5.1, Microsoft Excel 4.0, and After Hours' TouchBASE 2.0.1 — compressed by each of the eight products. We also measured the time required to open a 177K Word file, a 6K Word file, a 905K Excel file, and a 6K Excel file and the time required to alphabetically sort 1,050K and 154K TouchBASE databases, each of which had been compressed. The overall results, which are shown on a scale of 0 to 10, summarize our speed-test data on four Macs: a Classic with 4 megabytes of RAM and a Conner 40-megabyte hard drive, an LC II with 10 megabytes of RAM and a Quantum 80-megabyte drive, a IIci with 8 megabytes of RAM and a Quantum 80-megabyte drive, and a PowerBook 170 with 6 megabytes of RAM and a Conner 40-megabyte hard drive.

Prior to installation of the compression software, each hard disk was formatted with Apple's HD SC Setup. System 7.1 was installed with the default RAM cache, 32-bit addressing enabled, menu blinking off, virtual memory off, and file sharing off.



Archival Compression

For those who routinely exchange files across networks or over phone lines, archival data compression — which differs significantly from the automatic compression we examined for this report — can save time and money.

Archival compression is a type of file-level compression that is optimized to squeeze files as tightly as possible — no matter how long it takes to compress or decompress them. You wouldn't want to store files you use all the time in this format, because opening them would be unacceptably slow. But as its name implies, archival compression is useful for getting lots of old files onto a storage disk. It's also a great way to reduce transmission times on networks and modems: Smaller files travel faster and cheaper.

To ensure that the receiver can open your compressed files, vendors of archival-compression programs give you two options: You can create self-extracting archives, which enable the receiver to double-click on a compressed file to open it; this method adds about 10 to 20K to every file. You can also freely distribute a small extraction utility provided by each vendor for opening files compressed with its software.

Of the compression products we tested, More Disk Space, Now Compress, StuffIt Deluxe, and StuffIt SpaceSaver offer archival compression as well as automatic background compression. The shareware utilities Compact Pro and StuffIt Lite, which you can obtain from *MacUser*'s on-line service (ZiffNet/Mac) or other on-line services, also offer archival compression.

MacUser LABS Rating Tech Support

Because file-level- and driver-level-compression products differ considerably, we evaluated each product's tech-support staff by asking one general question that applied to all the products and two questions specific to each category.

Our evaluation of tech support for automatic-data-compression products took into consideration the accuracy of the responses, the speed with which our calls were answered, and the general level of courtesy and technical proficiency each vendor's staff exhibited.

Our questions and the expected answers were as follows:

GENERAL QUESTION TO ALL VENDORS:

Q. I copied 80 megabytes of TIFF image files from a CD-ROM to my hard disk, and they won't compress. What's wrong?

A. Some TIFF formats have their own built-in data compression; because these files are already compressed, your compression utility cannot affect them.

FILE-LEVEL-COMPRESSION PRODUCTS

(AutoDoubler, More Disk Space, Now Compress, StuffIt Deluxe, and StuffIt SpaceSaver):

Q. I'm using SyQuest cartridges to back up my hard disk, and I'd like to use automatic compression to save space on the cartridges. Should I set the utility to maximum speed or maximum compression?

A. Because you won't access the data on the cartridge routinely, the slower, maximum-compression setting is better; you'll save more space without your regular work suffering a speed penalty. [*For those products that provide archival compression on demand — all the file-level compressors except AutoDoubler — we accepted recommendations that the backup files be stored in archival format rather than in background-compressed form. — Ed.*]

Q. My disk, which contained automatically compressed files, crashed, and the system was corrupted. A friend helped install a new system, and now I can't open my files.

A. Your compression software was discarded with the old system and must be reinstalled for you to be able to open the compressed files.

DRIVER-LEVEL-COMPRESSION PRODUCTS

(eDisk, Stacker for Macintosh, and TimesTwo):

Q. I gave a coworker a SyQuest cartridge whose capacity had been expanded through driver-level compression. When she installs it, she gets a message that the disk is unreadable. How can she access the data?

A. The driver software installed in your coworker's SyQuest drive is incompatible with the driver-level-compression software. As an immediate solution, your colleague should reboot her Mac with your cartridge inserted in the drive, which eliminates the old driver and allows the cartridge to mount. To avoid this inconvenience in the future, provide your coworker with a copy of the removable-media utility or extension that shipped with your compression software.

Q. I used driver-level compression to change my 100-megabyte hard disk into a virtual 200-megabyte disk, and Get Info for my disk now reports I have 10 megabytes free. Is this enough free space?

A. Hard-drive vendors generally recommend leaving 10 percent of a disk's space free, as work space for the system. For a disk whose capacity has been increased to 200 megabytes, therefore, keep the reported free disk space at about 20 megabytes.

Key

Aladdin Systems

Aladdin Systems' technicians knew their stuff pretty well, stumbling only by failing to recognize that our TIFF files were already compressed. But they were a bit too slow to respond to the corrupted-system question, taking a little more than 23 hours to respond to our message. That's too long for people who can't access their files!

Alysis Software

Alysis Software boasted the promptest responses to our calls, and its technicians were courteous and patient. We asked them all five questions; three answers were dead-on, and two were partially correct: The technicians surmised we were using incompressible data in our TIFF question but didn't spot the files as precompressed, and on the SyQuest question, we had to hint *very* heavily to steer them toward a correct answer.

Fifth Generation Systems

Fifth Generation Systems' technicians answered all of our calls in less than two minutes and gave correct responses in each case except for a half-right answer to question 1: Although unaware that TIFF files come precompressed, the technician surmised that the data was simply of a type that doesn't compress well.

Golden Triangle Computers

We left a message with Golden Triangle after 4 P.M. one afternoon and received a call the next morning; our other calls were answered promptly. All the answers were correct, and the technicians were courteous and competent.

Now Software

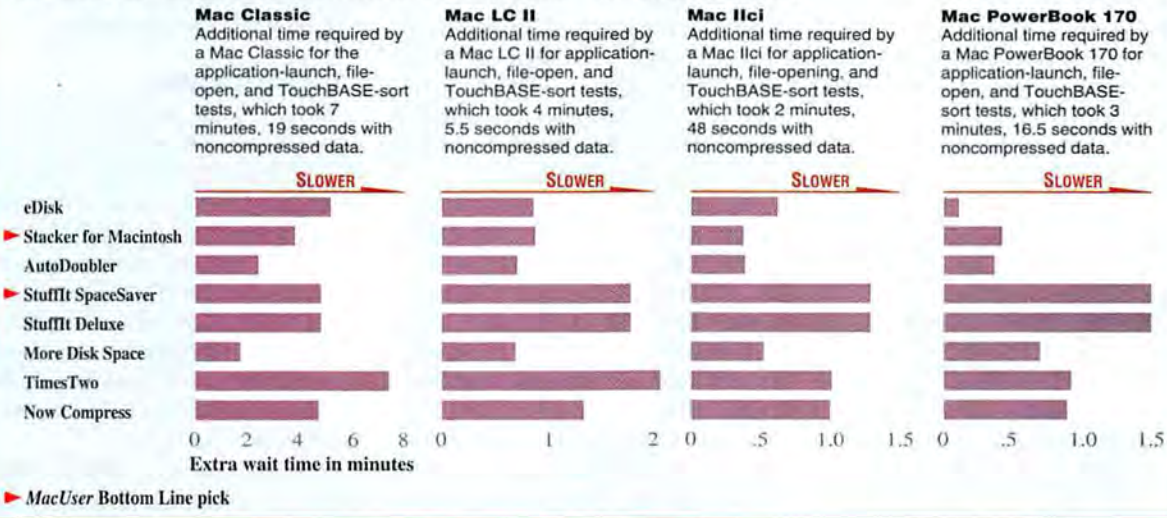
We were kept on hold for 20 minutes during two of our long-distance toll calls to Now Software and 5 minutes for the third. Once we got through, however, we found the technicians helpful and competent. Like those of several of the other vendors, the technicians were unfamiliar with precompressed TIFF files but correctly surmised that our image files were incompressible.

Stac Electronics

On one of the calls to Stac Electronics, we were asked to leave a message, and we received a callback within two hours; the other two calls were fielded immediately. All the responses were textbook-perfect, and the technician even answered the TIFF-file question before we could finish asking it.

MacUser LABS Figure 5: Watching Your Wait

Figure 5: Here's a graphical look at the extra time automatic data compression will keep you waiting for your Macintosh to perform a variety of typical tasks, depending on the Mac model you use. The charts indicate the combined extra time required by each Macintosh to launch Microsoft Word 5.1, Microsoft Excel 4.0, and After Hours' TouchBASE 2.0.1; to open a 177K Word file, a 6K Word file, and 905K and 6K Excel files; and to alphabetically sort 1,050K and 154K TouchBASE databases. Configurable products were set to the tightest compression option (eDisk was set for 2x compression).



simple, loading in a matter of minutes through the use of installer utilities.

Installing a driver-level compressor is more time-consuming. eDisk requires you to reformat your disk, erasing all the resident data. You then copy your backup files back to the disk — a tedious task, particularly if you rely on floppy disks for backup. Golden Triangle recommends the same approach for TimesTwo, but you can install the program on a disk that hasn't been erased. Stacker for Macintosh can install on unerased disks. Installation of these driver-level-compression programs includes a series of disk checks and data verifications that can take a few minutes to a few hours, depending on your Mac's processor speed and the capacity of your hard disk.

Go Configure

File-level-compression software gives you a variety of compression options. With the exception of More Disk Space, the file-level products we tested let you choose between "fast" mode, which minimizes the chances of slowing down your Mac during compression and decompression, and "tight" mode, which maximizes the amount of space freed up on your hard disk. You can experiment with both settings to see which you prefer. You can also adjust the speed of compression and decompression by varying file-cache size with AutoDoubler, More Disk Space, and Now Compress.

The five file-level compressors' options for excluding items from compression vary. Now Compress lets you select volumes, folders, and individual files in its unique Inspector window (see Figure 1) and exclude items on the basis of file type or System 7 label. AutoDoubler permits exclusion of folders and files by name and by label. StuffIt Deluxe and StuffIt SpaceSaver allow exclusion by filename, by label, and by addition of a user-specified prefix to a filename. More Disk Space excludes files by name only but is alone in giving you the option of excluding all application files from compression. You can also set More Disk Space to shut down your Mac when it has finished compressing your files.

Among the driver-level compressors, eDisk is the only product that has settings options, and it offers many (see Figure 2). At installation you decide whether the software should compress your data by two times (2x), three times (3x), or four times (4x). (Alysis recommends the 3x and 4x settings mainly for volumes that hold only highly compressible data, such as noncompressed graphics and database files. The 2x setting is for general use and was the one we used in our testing.) Your choice is permanent unless you reformat your disk. But within each of these settings, you can opt for fast, faster, or fastest compression speed. eDisk's Fast setting is comparable to a file-level compressor's tight option, and its Faster setting corresponds to a file-level compressor's fast option. The Fastest option performs no compression

but frees up disk space by customizing the allocation-block size.

Driver-level compression doesn't permit exclusion of files, but eDisk and Stacker for Macintosh support disk drivers that partition your hard disk into multiple volumes, so you can keep a partition containing noncompressed data on your disk. The version of TimesTwo we tested does not support partitioned disks, but version 2.0, which shipped after we finished testing, does.

Compression Tips

Here are a few tips on using automatic compression:

- **Back up to stay ahead.** Regular backups are essential for noncompressed data, but they're even more important once compression enters the scene. Although compression software doesn't damage data, it can complicate data retrieval when disaster strikes. So back up, back up, back up.
- **Beware of conflicts.** Driver-level compression cannot coexist with disk-security or encryption utilities that are disk-driver extensions. If you use products that apply password protection or encryption to your entire disk, consider file-level compression instead.
- **Compress, then encrypt.** If you store your data in encrypted form, use a file compressor *before* you encrypt your data. Encryption can eliminate the redundancy that enables compression to work. You can encrypt a compressed file, but not vice versa.
- **Don't shrink unshrinkables.** QuickTime movies, JPEG image files, many TIFF files, and the resource files used by many application programs are already compressed. Automatic-compression programs can't shrink these files, but they may waste time trying. In order to avoid this, store precompressed files in folders you've declared off-limits to your file-level compressor or place them in a partition that doesn't have driver-level compression.

Striking a Balance

Compression speed depends heavily on your Mac's processor speed and also on trade-offs with two other critical requirements of a compression product: efficiency and safety. The more tightly data is compressed, the longer the compression process takes, and checks and verifications that safeguard data integrity add extra time. The ideal compression product must balance speed, efficiency, and safety, so we tested the performance of each of the eight products in these three areas.

To see the effect of processor speed, we compared the time it took to perform various operations with compressed files on four Mac models: a Classic, an LC II, a IIci, and a PowerBook 170. We measured launch times for three compressed applications: Microsoft Word 5.1, Microsoft Excel 4.0, and After Hours' TouchBASE 2.0.1. We also timed opening small and large compressed files in Word and Excel and sorting large and small compressed database files in TouchBASE.

Our overall findings, showing the speed of working with files compressed by each product in relation to the speed of working with noncompressed versions of the same files, are in Figure 4.

If you use a Classic or other slow Mac, pay close attention to the results in Figure 5. If your patience is already taxed by the time the Mac takes to launch applications and open files, using compression could drive you to distraction. Consider buying a higher-capacity hard drive.

With respect to compression efficiency, Now Compress led the pack with reductions in file size of about 60 percent (see Figure 6). We saw the poorest compression results with More Disk Space, which reduced file size by about 35 percent. The driver-level-compression products clustered tightly, with TimesTwo and eDisk achieving the highest efficiency, reducing file size by 45 percent; Stacker for Macintosh achieved a reduction of about 40 percent. Bear in mind that although the efficiency of driver-level products is not as great as that of most file-level ones, driver-level compression extends to *everything* on your hard disk, including the System Folder. File-level compressors either exempt the System Folder from compression or advise you to use caution when compressing it.

Safety Testing

To check the safety features of data-compression products, we first looked for compatibility with standard data-recovery tools. We then looked for safeguards to prevent data loss as the hard disk containing compressed data fills to capacity. (Completely filling any disk, whether it contains compressed or noncompressed files, can be treacherous, because disk drivers need some scratch space to work properly.)

Our data-recovery tests involved efforts to resurrect data by using Symantec's Norton Utilities recovery tools. After installing Norton Utilities FileSaver on a test Mac, we dragged a folder containing six compressed files — two each created with Microsoft Word, Microsoft Excel, and After Hours' TouchBASE — into the Trash. We emptied the Trash and then attempted to recover the files. We also tried to salvage the files after using Apple's HD SC Setup utility to erase the disk. Per each compression-software vendor's instructions, we ran any disk-repair utilities that shipped with the compression software before trying to recover data.

Although Norton Utilities recovered all noncompressed versions of files, it was less successful once compression entered the scene. It was able to recover every file compressed with StuffIt Deluxe and StuffIt SpaceSaver, whereas files compressed with eDisk failed every recovery test.

On the erased-disk test, we could not salvage any files compressed with (driver-level) Stacker for Macintosh

or TimesTwo but we recovered every file compressed with a file-level compressor. Performance on the trashed-file test was mixed: In one of the two repetitions of the test, we recovered all the files compressed with More Disk Space, Now Compress, or TimesTwo. On the other try, however, our 960K Excel file posed a particular problem for the file-level compressors. It also caused trouble for the driver-level Stacker, whose compression made the file unrecoverable on both tries.

It's possible that the data on the disks could have been recovered by tools other than Norton Utilities, but the results of our safety tests nevertheless underscore the importance of backing up compressed data religiously. Although we saw no evidence that the use of compression software leads to data corruption, once disaster strikes, the software can complicate efforts to retrieve vital information.

Each of the compression products performed well as we filled disks containing compressed data to capacity, except More Disk Space, which issued no warning dialog boxes as we copied compressed files to the disk. When the disk filled up midway through copying a batch of files, copying simply ceased, with no indication the task was unfinished.

It's reassuring to know you can remove a product that affects all or most of your data from your system easily. Now Compress and Stacker

MacUser LABS Figure 6: Shrink Rap

Figure 6: The efficiency of automatic-compression products is demonstrated by their ability to compress a sampling of typical file types. Our test data consisted of the applications Word 5.1, Adobe Photoshop 2.5, Excel 4.0, and TouchBASE 2.0.1 and a selection of image and data files.

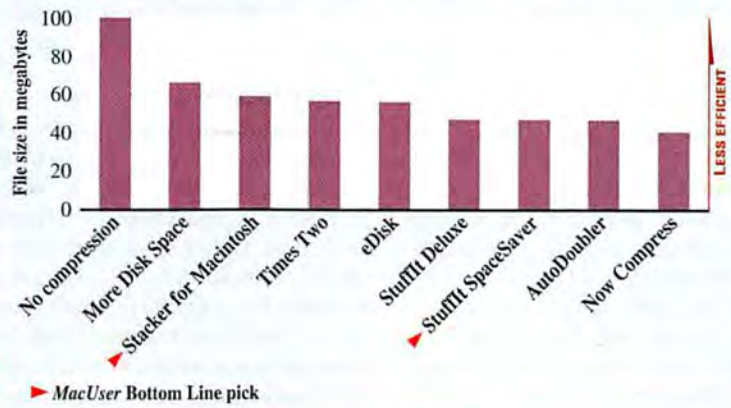


Table 1: Features of Automatic-Compression Software

	AutoDoubler 2.0.1 ★★★½	eDisk 1.0 ★★★	More Disk Space 2.2 ★★½	Now Compress 1.0 ★★★½
List price	$89.95	$149.95	$99.95	$99
Street price	$60	$80	$55	$65
Pros	Fastest file-level compressor tested. Toll-free tech support.	Fastest driver-level compressor tested.	Includes on-demand archival compression. Option replaces duplicate files with aliases to save extra space.	Includes on-demand archival compression. Most efficient compression. Extremely flexible configuration options.
Cons	Performed poorly on file-recovery tests. Installer works only on startup disk.	Unwieldy installation. Worst performance on all recovery tests.	Poor documentation. No alert when disk is full. Least efficient compression.	Slowest product tested.
Compression type	file-level	driver-level	file-level	file-level
Disk-repair utility included	yes	yes	no	no
Company	Fifth Generation Systems 10049 N. Reiger Rd. Baton Rouge, LA 70809 800-873-4384 504-291-7221 504-295-3268 (fax)	Alysis Software Corp. 1231 31st Ave. San Francisco, CA 94122 415-566-2263 415-566-9692 (fax)	Alysis Software Corp. 1231 31st Ave. San Francisco, CA 94122 415-566-2263 415-566-9692 (fax)	Now Software 921 S.W. Washington Ste. 500 Portland, OR 97205 800-237-3611 503-274-2800 503-274-0670 (fax)

for Macintosh make deinstallation a snap. Each uses an installer program to automate the process, and the procedures are clearly spelled out in each product's manual. The StuffIt Deluxe and StuffIt SpaceSaver installers are also deinstallers, but you'd never know it from their manuals.

To remove TimesTwo and eDisk, you must reformat your hard disk, which erases all of your data. AutoDoubler requires you to track down its control panels and preference files on your hard disk and trash them individually. More Disk Space provides a Remove button that deactivates the program's Finder menu but leaves the application in place.

Stacker, the only driver-level compressor that leaves decompressed data intact on your disk as it deinstalls, asks you to remove some data if there isn't room for all the decompressed data. The file-level compressors are less thorough: Removing them can make compressed files inaccessible, but only More Disk Space warns you of that possibility on-screen. Now Compress' manual does a good job of explaining how to decompress files before removing the utility, and — like AutoDoubler, StuffIt Deluxe, and StuffIt SpaceSaver — Now Compress provides a small freeware utility that you can use to decompress files if you don't have the compression program.

The Bottom Line

Using automatic data compression is a viable means of freeing up hard-disk space, but get ready for some trade-offs if you choose to shrink your data rather than purchase a higher-capacity drive. If you use a Mac that has a 68000 or 68020 processor, you'll see a noticeable slowdown in system speed as you access applications and files. And no matter which Mac model you use, get serious about regular data backups.

That said, Stac Electronics' Stacker for Macintosh is our top choice among driver-level compressors, for its combination of speed, efficiency, and ease of use. Its installation and deinstallation are extremely simple. We also like its ability to work with the disk driver of your choice — even letting you update the driver without deinstalling Stacker. Like the other driver-level compressors, however, Stacker delivered less than stellar results on our data-recovery tests, so let backup be your mantra.

Among the file-level compressors, Aladdin Systems' StuffIt SpaceSaver is our choice. Its combination of low price and flawless performance on our safety tests overcame our concerns about the sluggishness of launching application files it has compressed. StuffIt Deluxe combines SpaceSaver with advanced scripting and archival-decompression tools, but it's more than most users need. For those who just want to save disk space and dollars, SpaceSaver is the best file-compression bargain.

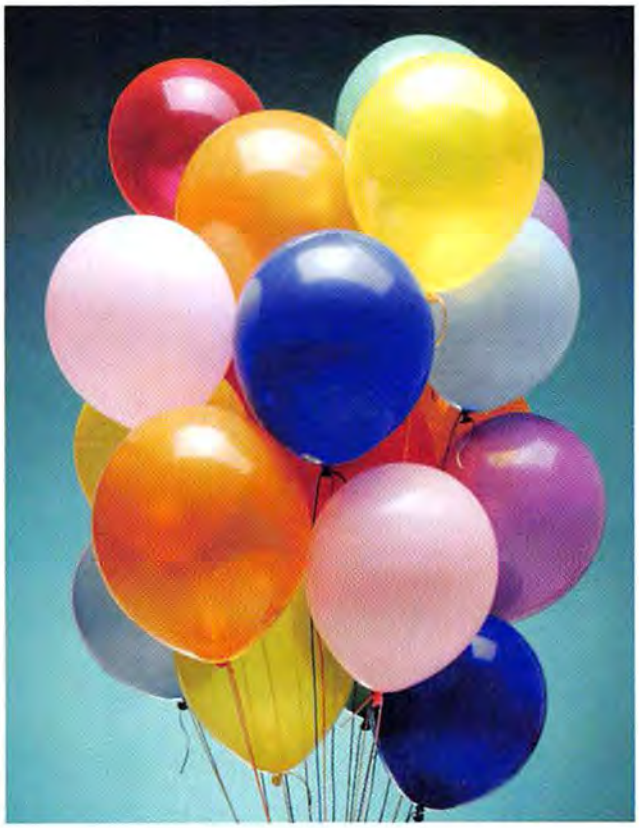
Associate editor Jim Shatz-Akin enjoys stuffed clams, compact discs, and fresh-squeezed orange juice. ZD Labs' Michael Clasen managed the testing for this report.

Table 1: Features of Automatic-Compression Software, continued

	▶ Stacker for Macintosh 1.0 ★★★★	StuffIt Deluxe 3.0.5 ★★★★½	▶ StuffIt SpaceSaver 1.0.5 ★★★★	TimesTwo 1.03 ★★★
List price	$149.95	$120	$59.95	$149
Street price	$70	$70	$40	$90
Pros	Very easy installation. Good balance of speed and efficiency.	Includes on-demand archival compression plus tools for scripting backups and opening non-Mac archival files.	Includes on-demand archival compression. Excellent price/performance.	Excellent tech support. Good documentation.
Cons	Tech-support free for 90 days; additional 90 days free for registered users; $2 per minute thereafter.	Slow on application-launch tests.	Slow on application-launch tests.	Slowest driver-level compressor tested.
Compression type	driver-level	file-level	file-level	driver-level
Disk-repair utility included	yes	no	no	yes
Company	Stac Electronics 5993 Avenida Encinas Carlsbad, CA 92008 800-522-7822 619-431-7474 619-431-9616 (fax)	Aladdin Systems 165 Westridge Dr. Watsonville, CA 95076 800-732-8881 408-761-6200 408-761-6206 (fax)	Aladdin Systems 165 Westridge Dr. Watsonville, CA 95076 800-732-8881 408-761-6200 408-761-6206 (fax)	Golden Triangle Computers 11175 Flintkote Ave. Bldg. 2 San Diego, CA 92121 800-326-1858 619-587-0110 619-587-0303 (fax)

▶ *MacUser* Bottom Line pick

So You're Not Supposed To Get Good Repro Quality From A Desktop Scanner...



Production Notes

Picture scanned at 150%, 400 dpi from a 4" x 5" transparency using the default settings. Final line screen was set in Adobe Photoshop and exported as a CMYK eps file. No color correction was made. Film was output from a Quark file at 133 line screen.

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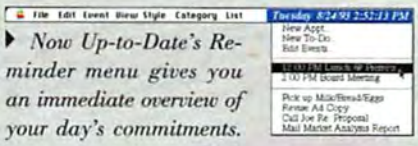

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DESKTOP PUBLISHING

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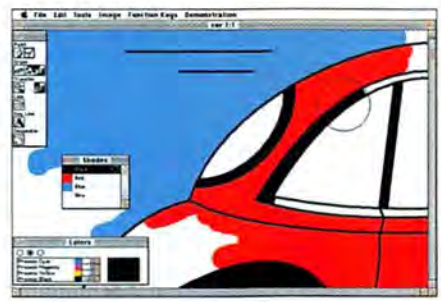

Color within the lines: Adding color to scanned line art usually means slopping paint buckets around in Photoshop and then, when the inevitable missing pixel lets color seep out, mopping up the mess with the eraser. For a faster way to color line art, take a gander at Colorize, a nifty little program from New Zealand that's being distributed here by DS Design. **Like crayons to a coloring book,** Colorize lets you paint color into black-and-white bit-mapped images. But unlike your childish scrawls, your colors stay within the lines, thanks to the program's smart brushes. You can modify the brush size to poke into tight corners or to swipe large areas, and colors are automatically trapped under the outlines. A special eraser tool lets you erase up to but not over lines. You can save files in EPS, TIFF, Photoshop, or Colorize format, the latter being an EPS format that saves white areas as transparent without making clipping paths. The program's packed with other features too, although the interface needs a little work (visual feedback for settings such as brush size would be nice). 919-319-1770. $399.

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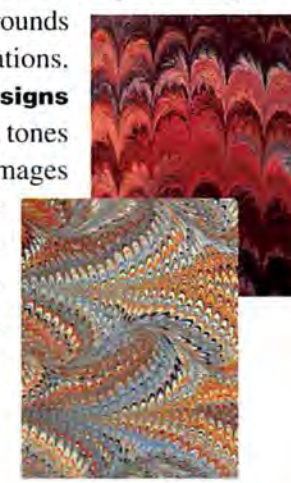

By Pamela Pfiffner

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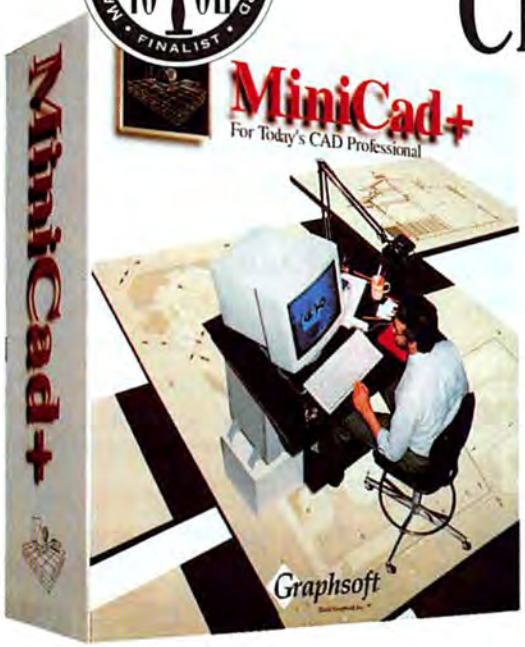

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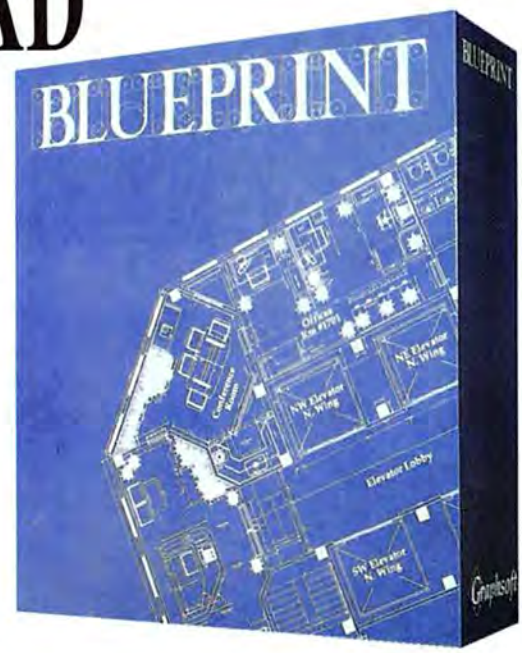

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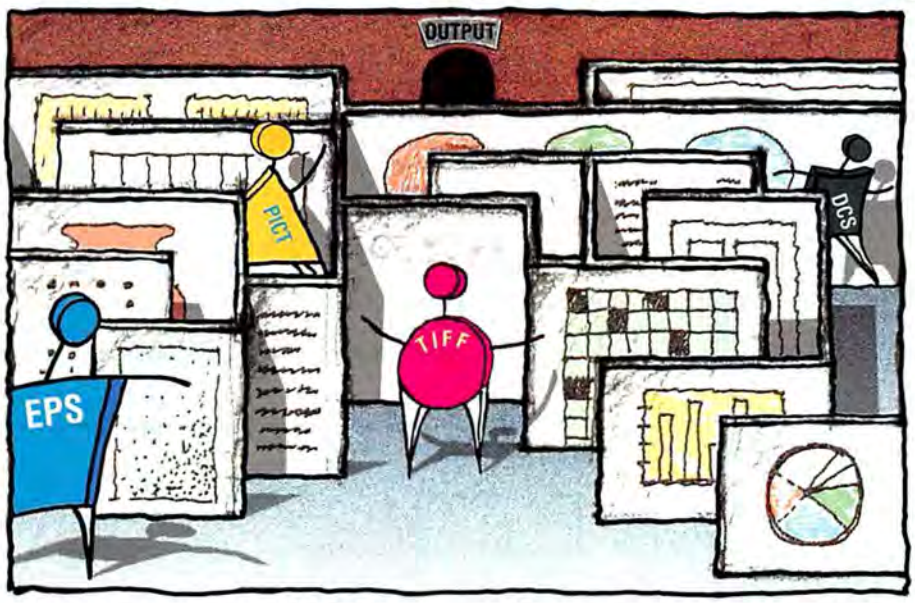
CIRCLE 108 ON READER SERVICE CARD.

Graphically Speaking



Remember when graphic file formats used to be a simple matter of TIFF or EPS? If you're planning to publish in color or across computer platforms, here's an update on some formats you should know about.

By Barrie Sosinsky

File formats are a perplexing and always evolving subject. For graphic artists and desktop publishers, it's hard enough to sort out TIFF, EPS, and PICT as well as the various formats native to specific applications. Now they also have to deal with two new twists: color publishing and cross-platform publishing. These days, desktop publishers need to know about DCS, WMF, and a raft of other arcane acronyms.

To help you through this maze of formats, let's quickly review today's common formats and then look more closely at emerging ones.

Graphic File Types

File formats — definitions of how data is to be written and read — are created by a vendor, a group of vendors, or a standards organization. A format specified by a vendor for use in one of its own applications is called a native or proprietary format. An Aldus FreeHand file is an example of a file in a native format. Many applications have filters that let you open another program's native format — Aldus PageMaker's filters for Microsoft Word files are one example.

To get around the issues raised by native formats, you can save images in several universal formats so that they can be readily imported into a wide variety of applications. These so-called interchange formats are based on whether or not an image is a raster image or a vector image.

Here's a thumbnail definition: Raster images are scanned, painted, or retouched images created in applications such as Adobe Photoshop, Light Source's Ofoto, Timeworks' Paint-It!, and other paint and image-editing programs. Vector graphics are drawn art and charts created in applications such as Adobe Illustrator, FreeHand, DeltaPoint's DeltaGraph, and other illustration packages. The difference between these image types both technically and aesthetically is akin to the difference between painting and line art.

Raster Images

Raster images are more commonly known as bit-mapped images. In a raster image, each picture element, or pixel, is mapped by location and color value in a plane — a process comparable to making a mosaic from tiles (see Figure 1). Editing a raster image is similar to scraping some tiles off one area (leaving a big hole in their wake) and placing them elsewhere. Also, rotating or scaling bit-mapped images can produce jagged edges in most applications, so you must take care when modifying them.

Black-and-white raster images occupy one plane and need only one data bit per pixel to describe the pixel's color values (or lack thereof). Color raster images are more complicated. They can be defined with various bit depths: with 8 bits per pixel (Indexed Color, which draws its colors from a set color palette), 16 or 24 bits per pixel (RGB — red, green, blue —

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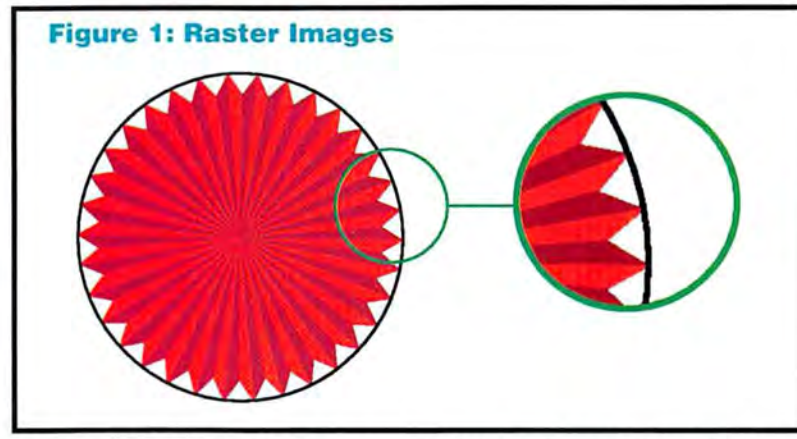

Figure 1: Raster, or bit-mapped, images are created from a mosaic of pixels in fixed locations. When enlarged, the pixels appear to grow, accentuating the image's jagged edges.

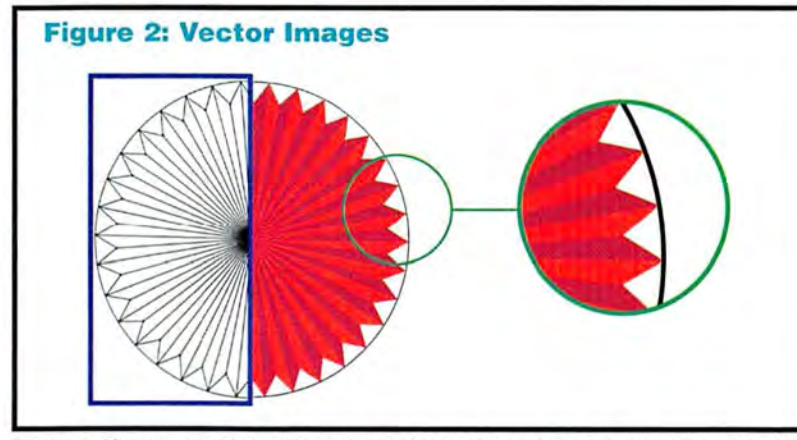

Figure 2: Vector, or object-oriented, graphics are composed from mathematically described drawing instructions (left). They can be broken down into separate pieces. When enlarged, the graphic scales smoothly.

which uses three planes to express color), or 32 bits (CMYK — cyan, magenta, yellow, black — which involves four planes of color). If that weren't enough, a new 48-bit alternative has been proposed. The file size of a raster image is dictated by the number of pixels and their bit depth; as a result, high-resolution color raster images can swell to many megabytes.

The two most common formats for raster images are Paint (PTNG) and TIFF.

Paint. The Paint, or PTNG, format is a throwback to the Mac's original graphics program, MacPaint. The PTNG format is extremely limited and is used primarily for black-and-white screen captures. PTNG images are strictly 72-dpi black-and-white bit maps with a maximum image area of 8 x 10 inches. Period. Many applications still support the format, though.

TIFF. The Tag Image File Format (TIFF) standard was codeveloped by Aldus and other vendors as a way of describing gray-scale images such as scanned photographs. The format has been updated to include support for color images. TIFF is the most versatile, reliable, and widely supported raster-image file format available for the Mac.

TIFF represents a nearly classic case study of what is right and what is wrong about file formats, however. TIFF is extensible; that is, developers can register proprietary tags with Aldus. TIFF is designed so that if the application reading a TIFF file doesn't recognize a tag, it skips to the next one. However, every time a tag is added to TIFF, a new flavor of the format is created, so TIFF now has as many different flavors as Baskin-Robbins has flavors of ice cream. That situation

complicates things and occasionally prevents an application from opening a TIFF file.

Vector Graphics

Also called object-oriented graphics, vector graphics are created according to a set of stored mathematical equations. Unlike with bit-mapped graphics, you can break a complex vector graphic down into smaller components, or objects; every object can have attributes such as line strokes and fills, each with different properties of color and pattern and transparency or opacity applied.

Generally, but not always, vector graphics are more compact than raster images. Sometimes intricate vector graphics require complex descriptions that overwhelm the memory and processing power of your computer and printer, as anyone who has ever seen a PostScript-overflow error can attest. Vector graphics always display or print at the maximum resolution of the output device — unlike raster images, which print at the resolution of the image itself, meaning that a 72-dpi bit map looks coarse even on a 600-dpi printer. Vector graphics are sharp and crisp, even when scaled in size (see Figure 2).

Some draw programs, such as Illustrator, FreeHand, and Deneba's Canvas, have their own native formats, but the most commonly used vector file formats on the Mac are PostScript, EPS, and PICT (which is actually a metafile).

PostScript. A PostScript file is a text file, usually written in ASCII, that describes a vector image. You can print a PostScript file on a PostScript printer without the file's original application by using a PostScript download utility, but you can't see what a PostScript image looks like until you've printed it.

EPS. The Encapsulated PostScript (EPS) format includes a PostScript text file and an optional low-resolution PICT preview of the underlying image. The data file can be written as text (ASCII) or as hexadecimal (binary). ASCII is the more widely accepted format, but binary files are smaller and print faster. Because it's based on PostScript, EPS has the advantages of that format plus the benefit of providing on-screen feedback.

Although EPS is associated with vector illustrations, you can save raster images in EPS format as well. Doing this doesn't transform your image into a vector graphic: It wraps the image's pixel data in a PostScript header, which gives identifying information about the file itself, but retains raster-specific file information on such aspects as clipping paths and screen angles.

For years, desktop publishers could get along very well, thank you, knowing only these formats.

Metafiles

A third type of graphic format is called the metafile, and it encompasses both raster and vector graphics. PICT (not an acronym) is the most common Mac metafile. Its counterpart on Windows-based PCs is the Windows Metafile format (WMF). PICT and WMF are the Clipboard standards of their respective systems.

PICT. Based on the Mac's QuickDraw graphics language, the PICT format consists of medium-quality vector art and low-resolution bit maps within a limited range of color. The more recent PICT2 format allows for 8-bit or 24-bit color at resolutions dictated by the originating application. Page-layout applications often have trouble importing PICT files, so PICT is better suited for on-screen presentations than for print publishing.

PICT embodies a classic problem of metafiles. Applications (QuarkXPress, for one) sometimes place raster images perfectly when reading PICT files but ignore or misread vector graphics. The reverse sometimes happens as well.

New Prepress Standards

For years, desktop publishers could get along very well, thank you, knowing only the above formats. Depending on the type of work you do, that still may be true. But if you're thinking about doing projects that require separations into color plates, you need to know about the CMYK color model and about three key formats designed for that purpose.

When working on color images, most desktop publishers simply use the RGB color model, which is what your monitor uses. It's impossible to print in RGB, so desktop color printers and imagesetters that create film for color printing convert RGB to CMYK, often with unpredictable results. Instead of letting the device handle the conversion, you may want to

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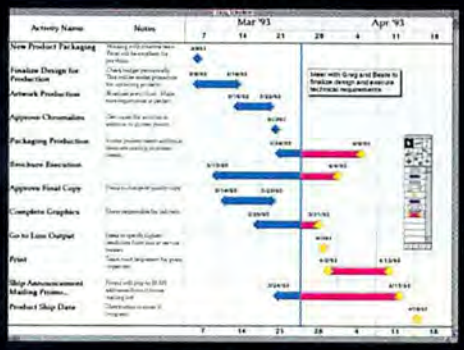

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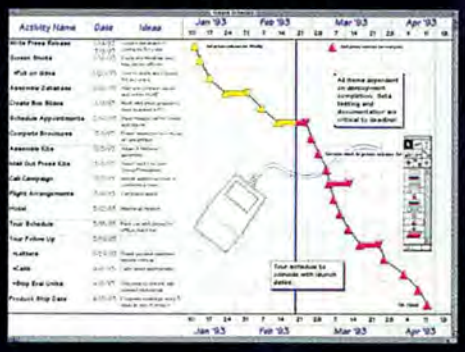

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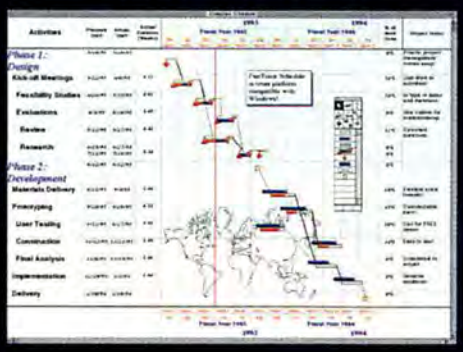

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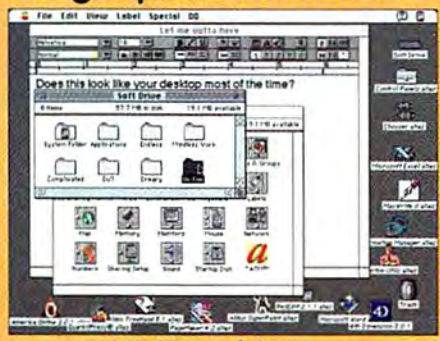

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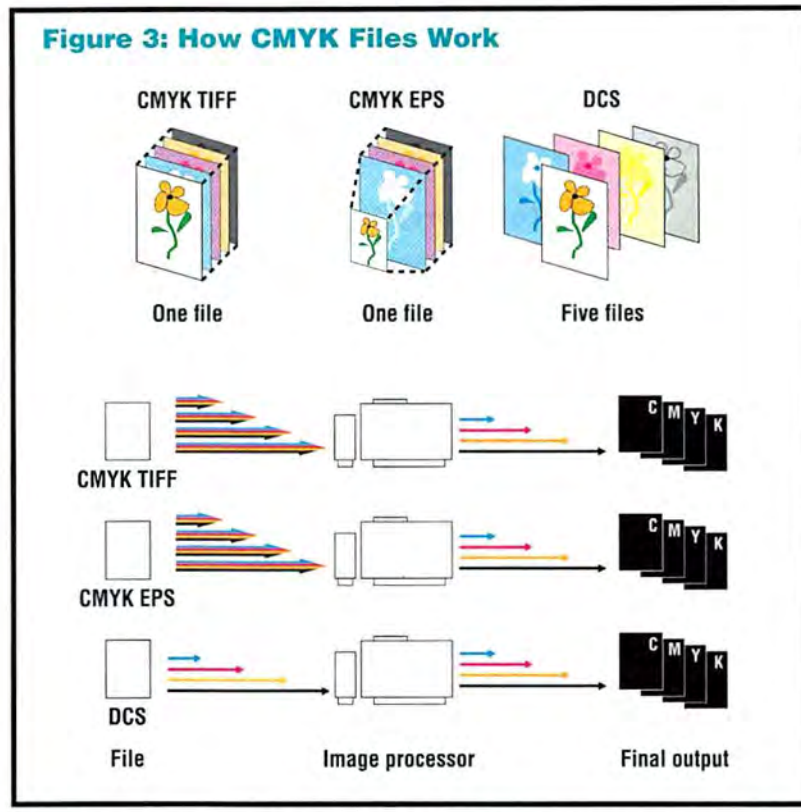

Figure 3: Files in the CMYK TIFF and CMYK EPS formats consist of one image that contains CMYK data; CMYK EPS adds a low-resolution preview. With DCS, however, five separate files are created — one EPS file for each color and a low-resolution preview. When you print CMYK TIFF or CMYK EPS separations, your entire file is sent to the image processor four times, once for each color. DCS files print faster, because each color is sent to the image processor separately.

gain more control over your images by converting them yourself and sending specific color and printing information to the output device along with the images. This conversion from three colors (RGB) to four (CMYK) adds bulk to files: CMYK files are 25 percent larger than their RGB counterparts.

The three main formats for sending CMYK files to printing devices are CMYK TIFF, CMYK EPS, and DCS (Desktop Color Separation).

CMYK TIFF. There's nothing fancy about a CMYK TIFF file. All that's saved in this format is an image's pixels, size, and resolution. It's up to the printer or imagesetter to supply screen angles, line screens, and so on. This can work to your advantage, because the printer's proven technology may work better than any setting you apply. When you print color separations, however, the entire CMYK TIFF file is sent to the printer four times — once for each color; each time, the printer extracts the appropriate information for just one color (see Figure 3). This results in long printing times, which add up if your prepress house charges by the minute. On the other hand, if a CMYK TIFF image has been cropped, only the selected area goes to the printer — a nice economy. And if you're printing to a desktop color printer, you'll get a high-resolution image, not a low-resolution proxy.

CMYK EPS. Like all other EPS files, images in the CMYK EPS format have two parts: a central file that contains PostScript code with the addition of CMYK color data, and a low-resolution PICT preview. Like CMYK TIFF files, the CMYK EPS file is sent to the printer four times. In this case, however, if an image has been cropped, the entire file is sent anyway.

Unlike the CMYK TIFF format, CMYK EPS allows you to specify clipping paths, screen angles, line screens,

spot functions, and so on. These settings override those of the printing device, so finicky publishers often prefer this approach. When you print to a desktop color printer, however, you get the low-resolution preview image rather than the high-resolution image.

DCS. Developed by Quark for images placed in QuarkXPress, the DCS format is in many ways similar to CMYK EPS. But instead of using one PostScript file and its low-resolution preview, DCS breaks color separations into five files: four EPS files (one for each color) plus a composite "master" low-resolution PICT preview file. Changes made to the master file are passed on to the other files when they're printed. That fifth file causes DCS images to take up more disk space than CMYK TIFF ones, but DCS images print faster than either CMYK TIFF or CMYK EPS ones. That's because only the individual color files are sent to the printer, rather than the entire image four times. A newer, single-file version of the format, DCS 2.0, lets you include spot color in CMYK files.

As with CMYK EPS, specific image information such as screen angle, line screen, and even clipping paths is saved with the files and sent to the printer. Also as with CMYK EPS, when you print to a desktop color printer, you get the low-resolution preview image instead of the high-resolution image.

Which should you use? If you don't want to sweat the details or if you're printing to a desktop printer, CMYK TIFF is for you. Some publishing professionals currently prefer DCS, however, even though files in this format take up more disk space, because the DCS format gives them shorter printing times and more precise control. DCS is not as universally available in applications as TIFF and EPS are, so check for compatibility before you use it.

Cross-Platform Formats

If file formats on the Mac seem bewildering, be glad you're not a PC user. On the PC, native formats are the rule, so you're confronted with scores of formats developed by application vendors. Some efforts have been made toward creating viable interchange formats that make it easier for Mac and PC publishers to share graphics, however.

If your images need to be read on Macs as well as on PCs, files saved in TIFF or EPS formats are your best bet. TIFF, EPS, and some other formats have PC counterparts. Remember that PCs and Macs use different filenaming conventions, so you need to rename your files when you're moving them across platforms. Good translation software should take care of the details for you.

For vector images, EPS is pretty much it. The Computer Graphics Metafile (CGM), a rich file format defined by the International Standards Organization (ISO) and the American National Standards Institute (ANSI), is not used on the Mac. The WMF format is gaining favor, however, and you'll find DXF, a high-quality vector-graphic format written in ASCII form, used in computer-aided-design (CAD) programs and some modeling programs on both platforms.

Keep in mind that PICT and WMF formats are native to Macs and Windows PCs, respectively. Only the Mac understands PICT files, so convert them to a PC-compatible format before sending them from a Mac to a PC. Similarly, WMF files, which use the Windows Graphic API (application-programming interface) are ill-suited to the Mac. Be that as it may, the PICT and WMF formats are standards, and they *can* work well as transport formats.

Less common formats give good results in cross-platform work too. TrueVision's 32-bit Targa (TGA) image format and CompuServe's 8-bit Graphics Interchange Format (GIF) are raster formats that are well established on both Mac and PC platforms. GIF was designed with economies necessary for on-line services in mind, however, so it's too limited for high-quality publishing.

When you're working with programs that have cross-platform twins, such as PageMaker, FreeHand, Illustrator, Photoshop, QuarkXPress, and others, your best bet may be to simply save your file in its native format and then transfer it across platforms via a conversion utility.

You can choose from a wealth of programs designed to translate between most graphic formats on Macs as well as PCs. But you may already own one program that lets you save files in many of the formats described here: Photoshop.

Barrie Sosinsky is the author of several computer books, including *Beyond the Desktop: Tools and Technology for Computer Publishing*. His company, Killer Apps (Newton, Massachusetts), specializes in cross-platform computing. File formats are the bane of his existence.

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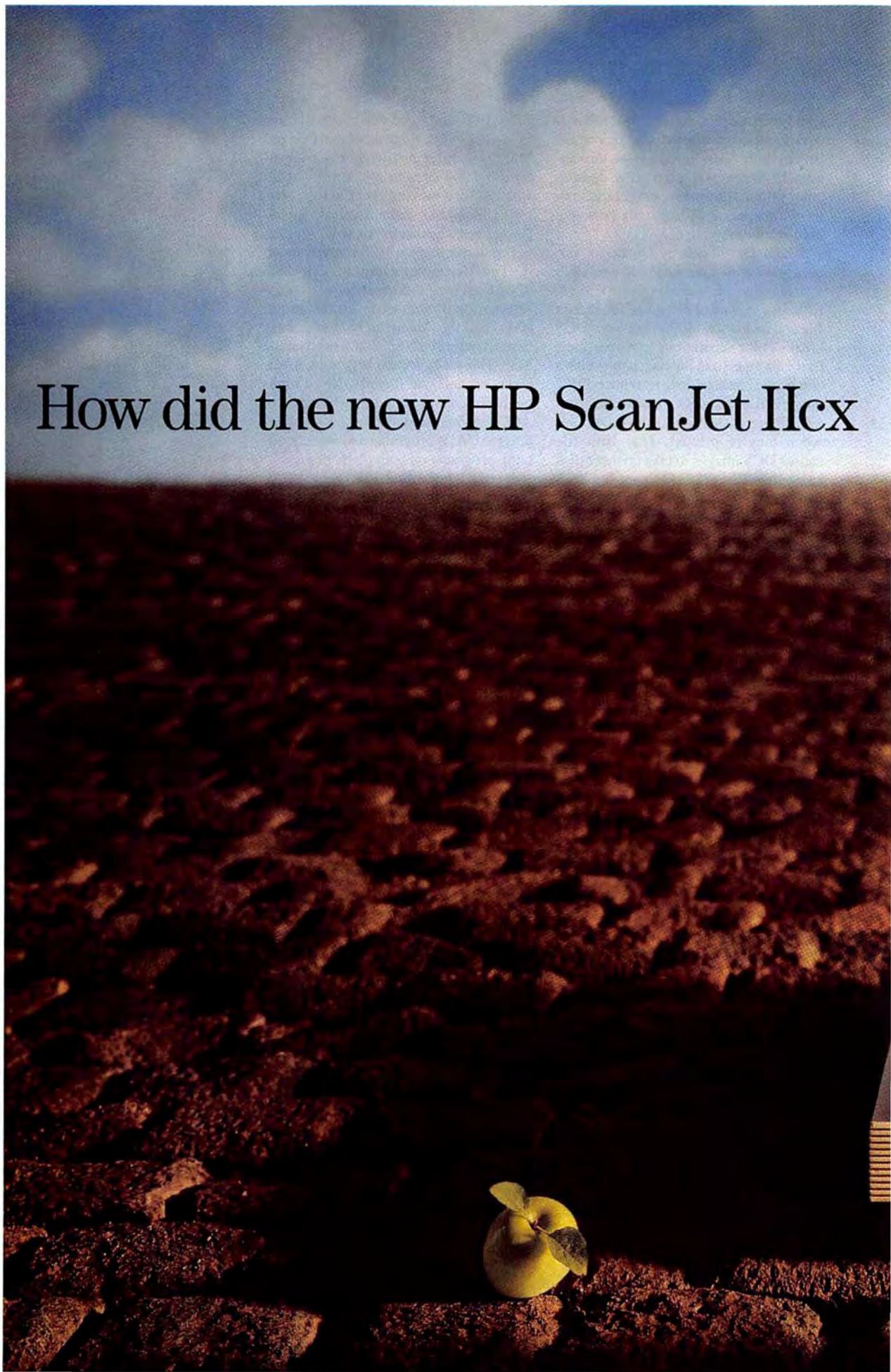

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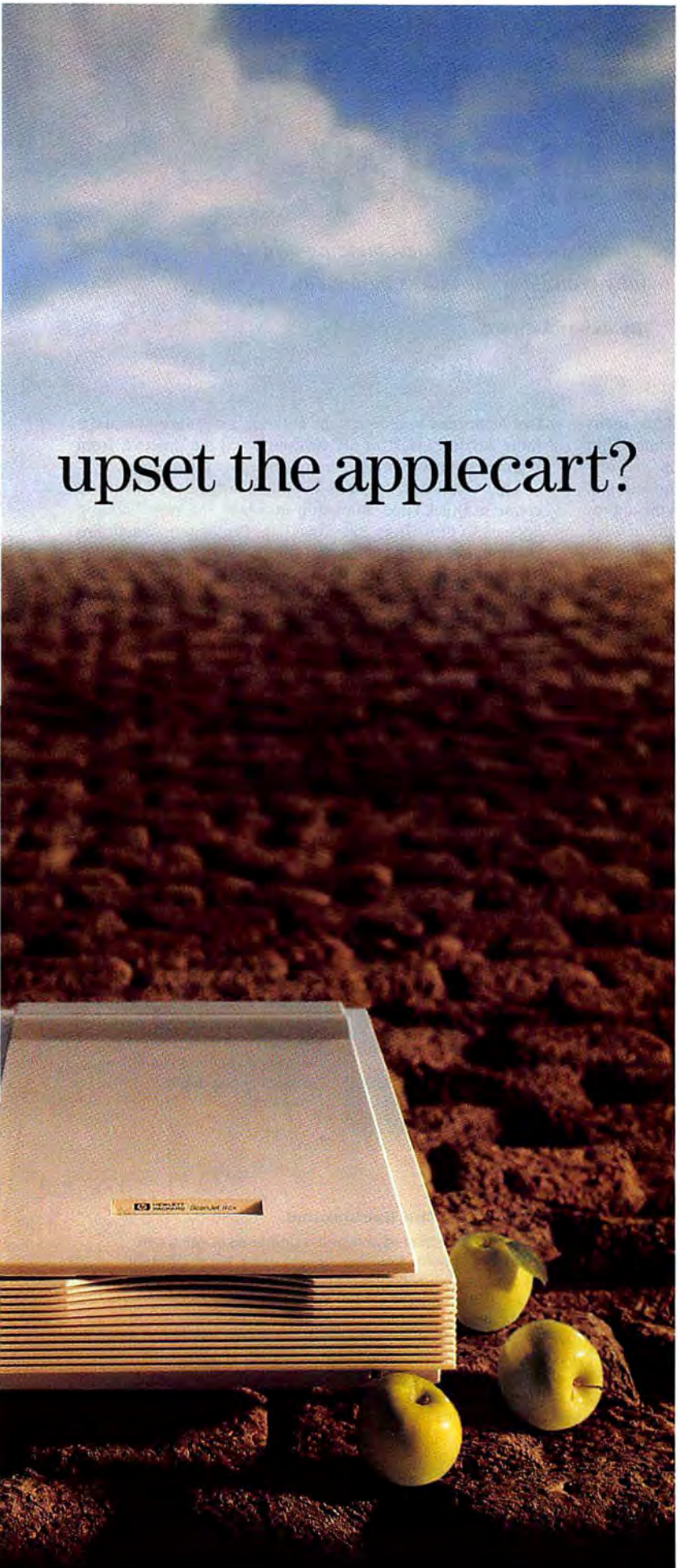

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Built in a Day

Off-the-shelf software lets an architect take his latest building project from flat concept to fully realized scene in less than a day.

By Janet Ashford

Visualizing how a site-specific project will look in its proposed environment is never easy. But architect Jim Lennon, of Del Mar, California, uses the Mac and off-the-shelf software to create photomontages, 3-D models, and QuickTime animations to situate new buildings in the appropriate scene. The process gives clients a clear picture of what the new building will look like on the site and helps Lennon fine-tune his design.

Recently, Lennon created photo-realistic sketches of his plans for the new Children's Hospital of Orange County, using autodessys' form•Z for modeling, Strata's StudioPro and Ray Dream's JAG II for rendering, Adobe's Photoshop for compositing, and Fractal Design's Painter for retouching. Placing the hospital in its actual environment showed Lennon that he needed to redesign the building's entrance to make it more inviting. Best of all, he completed the process, from scanned photos to printed comps, in about seven hours.

That same day, he used Gryphon Software's Morph to create a QuickTime animation in which the new building appears to grow from the ground up. He then ran StudioPro overnight to create frames for a fly-through of the building. The next day, he used his Quadra 840AV to put the two animation sequences on videotape for a client presentation. Finally, he used Aldus PageMaker to make a keepsake booklet of Photoshop montages for his client.

Janet Ashford is coauthor with Linnea Dayton of a forthcoming series of computer how-to books, to be published by Graphic-sha, of Tokyo.

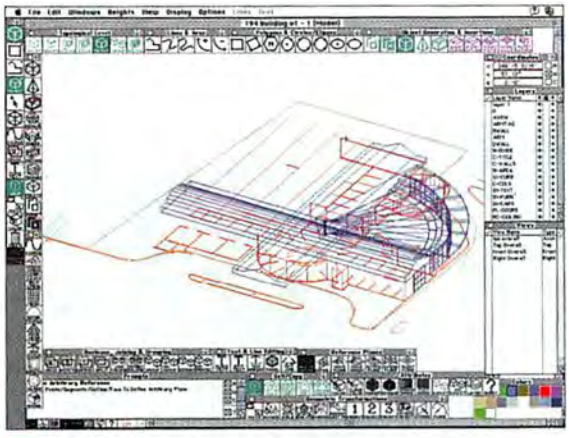
To better visualize a new hospital on an existing site, architect Jim Lennon uses Photoshop to combine an edited photograph of a parking lot with a StudioPro rendering of a new-building model created in form•Z. Printing the results on beige, textured paper gives him a watercolor-style image with the look of an architectural rendering. The architectural sketch and several variations took only one day to produce.

1 Composing the Background

Lennon pans his camera across the proposed building site, taking several photos from the same position but in different directions. Using a Microtek II ScanMaker, he scans two of the 3-x-5-inch photos at 72 dpi. To improve clarity, he enlarges them 284 percent, which increases the total image width from 360 pixels (5 inches wide by 72 dpi) to 1,024 pixels. He opens both scans in Photoshop and, after enlarging the canvas size, combines them by copying and pasting selected parts of one photo into the other photo. The seam between the two is visible in one of the rightmost parking lines.

2 Touching Up the Composite

Lennon crops out the weeds in the foreground and then uses the rubber-stamp tool to retouch the asphalt. He uses various painting and blurring tools to minimize the seam between the two photos.



3 Making the Building Model

To fashion a 3-D model of the new building, Lennon uses form•Z in Draft mode to draw the building perimeter and floor plan. Switching to the program's Model mode lets him extrude some of the walls upward to form a 3-D facade. Lennon likes form•Z because of its good scaling capabilities and its ability to perform Boolean functions such as combining simple shapes into complex objects.

4 Rendering the Model

Lennon saves the form•Z model in DXF format and opens it in StudioPro for rendering. He applies surface textures to the model's component geometrical shapes — adding transparent and reflective glass properties to the skylight and the large front windows, for example. He positions light sources and angles so they duplicate the light conditions in the photographs and places the model in a simple, monochrome environment for easier selection during compositing. Because he renders the model at 72 dpi without anti-aliasing, the rendering process takes only about one hour. Afterward, he uses JAG II to apply anti-aliasing to the PICT file to soften the pixellated diagonal lines in the image.

5 Placing the Building in the Photo

Opening the PICT file of the rendered building in Photoshop, Lennon uses the magic-wand tool to select the sky and the asphalt around the building and then chooses Inverse from the Select menu to select the building rather than the background. He copies the building selection and pastes it into a copy of the photo composite (cutting off the tops of two of the cars in the process).

a

b

6 Finishing the Composite

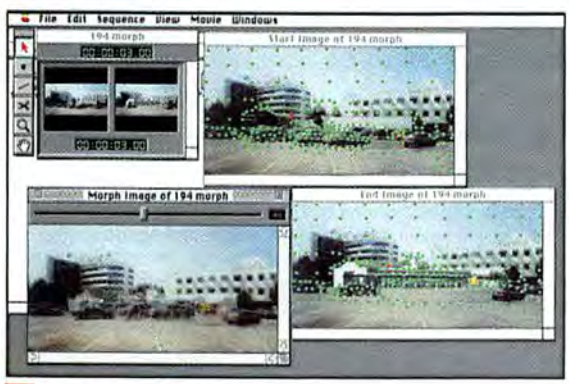
If the picture is to have a sense of depth, the hospital needs to appear in front of the other buildings but behind the cars. Lennon restores the tops of the cars by using Photoshop's lasso tool to select them from the original background (step 2) and pastes each car into a separate document to clean up its outlines (a). He pastes the selected cars into the final image and applies a 1-pixel feather to blend the edges of the cars into their surroundings (b).

a

b

7 Printing the Montage

To better visualize the project in progress, Lennon prints his final image with a Hewlett-Packard DeskWriter 550C inkjet printer on beige, textured paper. For an impressionistic variation of the original, he experiments with Painter's filters and watercolor brush in Clone mode so that the background is blurred but the building stays in focus (a). To show another view of the building, Lennon renders the model a second time and pastes it into a different starting photo (b).

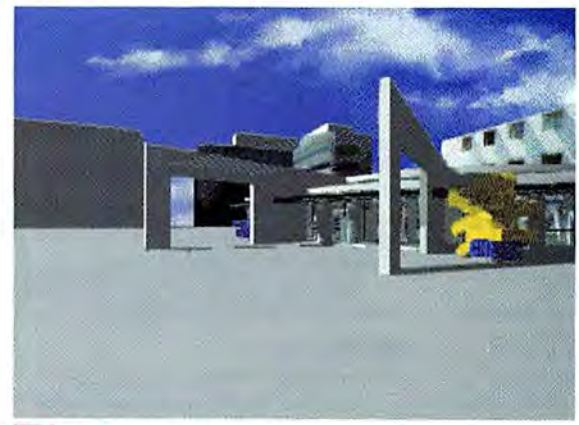


8 Morphing the Scene

Lennon uses Morph to create a three-second QuickTime movie for his client. He carefully positions reference points in the start and end images (above), producing a sequence in which the building appears to grow out of the parking lot from the ground up and the cars morph into the columns of the building.

9 Modifying the Model

By working with the images and looking at the inkjet prints, Lennon can visualize the new building in its actual setting, get a sense of its mood, and determine what elements need modification. Lennon decides to add a more dramatic entryway to the building (shown here in a StudioPro rendering) to help lead the visitor's eye from the parking lot to the hospital entrance.



10 Creating Animated Scenes

To give the client a sense of what it would be like to enter the building, Lennon puts together a ten-second QuickTime fly-through of the model, zooming from the parking lot through the front entrance and into the building. He adds detail to the form•Z model and then renders it with StudioPro at 300 frames. The entire animation (a frame of which is shown above) takes about ten hours to render. In Adobe Premiere, Lennon assembles the QuickTime animations of the morph and the fly-through, creating an overlap dissolve between them. Using his Quadra 840AV, he outputs the animation directly to a VHS videotape cassette so his client can view it.

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Cheap Ethernet: You can now get an Ethernet box for a printer for **less than $400.** Focus Enhancements' EtherLAN Print, which supports two LocalTalk devices, and EtherLAN+, which supports six LocalTalk devices, have suggested retail prices of $299.99 and $399.99, respectively. And unlike some other LocalTalk printer boxes, these stand-alone units aren't limited to use with printers — you can connect any LocalTalk device (including a PowerBook) to an Ethernet network as an independent node with its own network address. 617-938-8088.

Cross-dressing telecom: DCA (Digital Communications Association) has ported its popular Windows telecom software, CrossTalk, to the Mac. CrossTalk for Macintosh ($195) supports the Macintosh Communications Toolbox, which means it can communicate over a variety of network telephone connections and provide terminal emulation for UNIX, VAX, and mainframe hosts. Despite its Mac guts, CrossTalk for Macintosh looks a lot like its PC cousin, sporting **Windows-like interface** conventions and a tool bar. One good feature: Scripts created on one platform can run on the other. 404-442-4000.

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By John Rizzo

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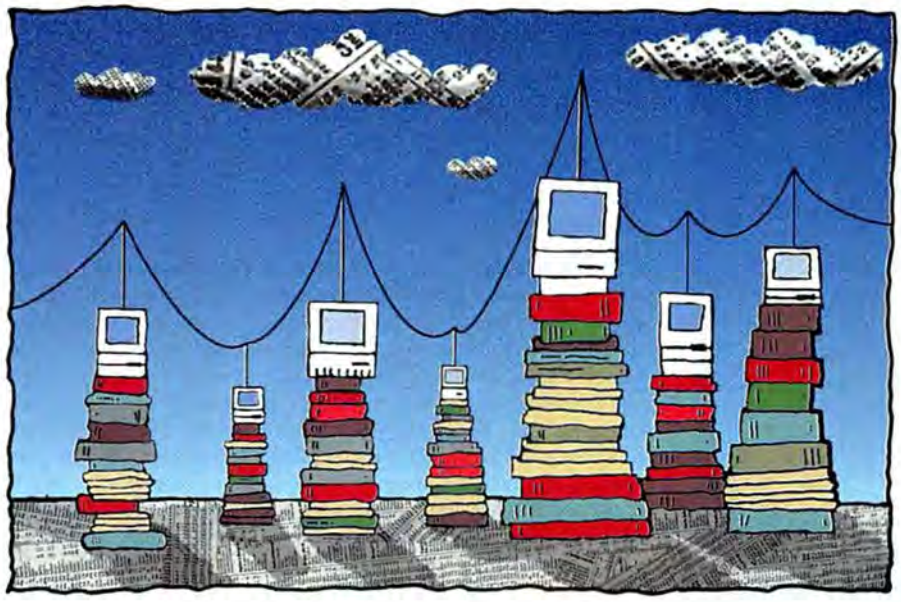

A wealth of information is available by modem, but locating the byte you need from among the gigabytes requires some strategy.

By Joe Clark

You don't have to wait around for Bill Clinton's much-heralded information highway if you want access to gigabytes of on-line information at the click of a mouse. Worldwide, some 5,210 databases from 2,220 vendors are now available on 820 on-line services. You can access this immense wealth of information with just a modem, a Mac, and telecommunications software. There's a catch, though: It's often tough to find the information you need in the on-line universe, and on-line searching brings you in contact with the kind of character-mode, DOS-like computing environment Mac users pay good money to avoid. By following some simple rules, you can make on-line discoveries quickly and relatively inexpensively.

Starting the Search

First, consider the most appropriate medium of information. If you just want to find the current trading price of a company's stock, you might be better off watching the ticker tape on CNN Headline News. If you want the text of every article written on affirmative action between 1985 and yesterday, you need an on-line source.

Electronic purists, take note: Don't do everything on-line. It's nearly impossible — not to mention expensive — to find out purely through electronic means which databases are out there and exactly what they contain.

The best place to start an electronic search is with old-fashioned paper — books that contain directories of databases. Such books can tell you the on-line locations of the databases you're looking for. The *Gale Directory of Databases* (Detroit: Gale Research, 313-961-2242; $280) and the *Online Factbook* (Stamford, Connecticut: Digital Information Group, 203-348-2751; $395) are the most authoritative sources; the *Whole Earth Online Almanac,* by Don Rittner (New York: Brady, 1993; $32.95), and *The Electronic Traveller,* by Elizabeth Powell Crowe (New York: Windcrest Books, 1994; $16.95), are less expensive alternatives you can pick up in your local bookstore. The two-volume, 2,262-page *Gale Directory of Databases* is the reference standard. Volume 1 lists on-line databases alphabetically, by database producer, by subject, and even by geographic location. It lists not only big-name databases such as Lexis and Nexis but also obscure databases pertaining to small colleges and universities; economic forecasts; salaries and other benefits for executives; and the full text of *Union Labor Weekly Newsletter, American Banker,* and scores of other publications.

Among the other sources of on-line directories are industry newsletters such as *Full-Text Sources Online* ($175) and *Newspapers Online* ($130), both from Bibliodata (617-444-1154). Each is updated twice a year.

Directories of on-line databases are also now being published on CD-ROM. These can frequently be found in public or university libraries (and are often updated weekly or

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INFORMATION SERVICES

monthly) or, like Information Access' Computer Select, are offered by subscription. However, it's rare that one CD-ROM will contain everything you need. The best advice is to act like an artist and work in mixed media. You'll save time and money.

Using Search Software

Once you know which databases to look at, you'll need telecom software for dialing in to the services. Most on-line databases tend to gravitate to the lowest common denominator of computing, ASCII text. These you access by using a general-purpose telecom program, such as Hayes Microcomputer Products' Smartcom or Software Ventures' MicroPhone. Expect a more or less unfriendly and text-heavy interface. Sometimes you can download a file directly to your hard disk, but often you must copy text from your communications program and paste it into a word-processing document.

Some services, such as America Online and AppleLink, offer graphical front-end software for primary access. Other programs — such as FirstClass, from SoftArc (416-299-4723), and CIM (CompuServe Information Manager) — act as graphical front ends to text-based databases. FirstClass is widely used on Mac-specific BBSs such as Toronto's MAGIC.

Searching databases is addictive, and search software often encourages you to browse, which can be expensive when the service charges by the minute. The pros plan ahead, log on, get what they need, and log off. Consider training one or two staff members in how to search efficiently instead of letting a large group of employees make money-gobbling search mistakes on-line ("Oops! I meant *Smyth*, not *Smith*"). Searching without using menus (a so-called free-text search, using a command-line interface) can cut your search time in half, but you have to bone up on the commands. Even restricting searches to, say, articles that have appeared only in the last three months reduces the chaff you find alongside the wheat.

Full Line of On-Line Services

Listed here are but a few of the many on-line services you can use for gathering information from all over the world. The rates listed below will give you a rough idea of how much each service costs, but keep in mind that most services have discount access rates for nonbusiness hours. Many services apply a portion of the monthly or yearly fee toward hourly usage. Call the services for detailed rate information.

Commercial Services

America Online. Features news, weather, sports, stock quotes, software libraries, computing support, an Internet gateway, and electronic mail, with a Mac-like interface. $9.95 a month; $3.50 an hour after the first five hours. 800-827-6364 or 703-448-8700.

AppleLink. Includes Apple Computer and third-party product news and information, electronic mail, and an Internet gateway. $70 sign-up fee; $12 a month; $12 to $37 an hour. 800-462-4396 to receive application by fax, or 408-974-3309.

CompuServe. The largest commercial service, CompuServe includes libraries on computer technology, business, entertainment, and news. It also offers electronic mail. $39.95 for the membership kit, which includes a $25 usage credit; $2.50 to $8.95 a month; $8 to $16 an hour. 800-848-8199 or 614-457-8650.

GEnie. Features news, consumer information, and financial services such as stock quotes and a database of trade names. It is also a Dow Jones News/Retrieval gateway. $8.95 a month; $3 to $15.50 an hour. 800-638-9636 or 301-340-4000.

Prodigy. Includes news and business, travel, and education information as well as forums for children. You can also shop electronically. $7.95 to $19.95 per month. 800-776-3449 or 914-993-8820.

The Well. A conferencing network for on-line conversation on a wide range of topics. It's also an Internet gateway. $15 a month; $2 a hour. 415-332-4335.

Global Networks

Bitnet. The service is used mostly for correspondence among researchers. The rate depends on the host university but is usually free. Call your local university to see if you can subscribe through it, or subscribe through the Internet. 202-872-4200.

FidoNet. An amateur network of bulletin boards that connects to more than 40 countries. Look for it on commercial on-line services.

The Internet. The largest computer network in the world, the Internet is used for

The best place to find on-line databases is with old-fashioned paper. *The Electronic Traveller, Whole Earth Online Almanac,* and *Online Factbook* are good references.

Paying the Piper

Although genuinely free information does exist, you may have to hunt around for it and all you'll probably unearth are citations (title, subject, author, and publication data) instead of the full text of an article. Some larger public libraries conduct free on-line searches, although these searches are usually limited (one search per day, for example, or ten citations only). For cash-strapped small businesses, this may be just the ticket.

If you're willing to pay for data, be a wise consumer and shop around. Often the same publications are available in different databases at different rates and with different lag times. *The Economist* magazine, for example, is available on-line via Nexis for 80 cents a minute plus 25 cents per line of text displayed; you can also find it in England's FT Profile database for roughly double the price. Alas, you may not always have a choice of on-line service if the information you

electronic mail, file transfers, and remote log-on. It also contains libraries and scientific databases. The rate depends on your access method — it can be as low as the cost of your telephone calls. 800-444-4345 or 619-455-4600.

MCI Mail. A worldwide electronic-mail service, it is also a Dow Jones News/Retrieval gateway. $35 a year; 50 cents per 500 characters sent. 800-444-6245 or 202-833-8484.

Libraries and Databases

BRS After Dark. Contains databases on environmental issues, science, and medicine. $80 startup fee; $12 per month; $10 to $50 an hour. 800-955-0906 or 703-556-6750.

Data-Star. Features more than 300 databases of information on the international marketplace. $37 to $195 an hour. 800-221-7754 or 215-687-6777.

Dialog. Contains 450 databases of information on business, science, technology, and millions of domestic and international companies. $295 sign-up fee; $25 to $300 an hour; $75 yearly renewal fee. 800-334-2564 or 415-858-3785.

Dow Jones News/Retrieval. The only on-line service that offers the full text of *The Wall Street Journal, Barron's, Business & Finance Report,* and *American Demographics.* Rates are as high as $200 an hour. 800-522-3567 or 609-452-1511.

IPlus. Offers a variety of business topics, including analyst- and marketing-research reports. You access it through Dialog or IPlus Direct. $99 an hour; $5.75 to $18.95 per page retrieved. 800-662-7878 or 212-952-7060.

Knowledge Index. A subset of Dialog that's less expensive. $39.95 for CompuServe membership kit; $2.50 to $8.95 month; $24 an hour. Accessible through CompuServe.

NewsNet. Access to more than 600 business newsletters and 20 worldwide news wires. $15 a month; $60 to $90 an hour. 800-345-1301 or 215-527-8030.

Nexis and Lexis. Nexis gives you access to more than 3,000 databases containing financial services, newspapers, news wires, magazines, and television transcripts. Lexis is the legal equivalent of Nexis. Rates are as much as $35 to $40 for ten minutes of access. 800-227-4908 or 513-865-6800.

Orbit. Bibliographic retrieval for science researchers. $15 a month; $60 to $150 an hour; $55 a year per user for one to five users. 800-955-0906 or 703-556-6750.

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seek is highly specialized, such as news on international taxation.

Full-text databases contain the contents of a periodical's articles rather than just abstracts of the articles. However, a full-text database doesn't guarantee you an electronic clone of a printed original; it isn't a replacement for printed publications. Databases often don't contain minor or short articles — or, for that matter, photos, captions, ads, letters to the editor, cartoons, charts, or graphs.

In addition, different on-line services excerpt different publications to different degrees; there are no standards. For instance, Bibliodata's directories classify full-text databases as "nearly cover-to-cover" (watch out for that *nearly*) or "selected" (a noticeable chunk of information is missing). The only reliable approach is to contact each on-line service or the publication being excerpted and ask how thorough the coverage is.

While we're at it, let's explode another myth of on-line databases: immediacy. Occasionally the electronic text and its printed source are available at roughly the same time (and certain items, such as some newspapers, are available on-line a few hours before publication), but a 90-day lag time between hard-copy and on-line availability is the norm. *Full-Text Sources Online* and the *Gale Directory of Databases* note the updating schedule and lag time of each database.

The Future

As computers and video converge, people will increasingly want to archive television programs and news reports. The problem is extracting just what you want from a continuous and often unpredictable video flow. Although Denver's Journal Graphics maintains an on-line Internet database of titles and abstracts of the many news programs it transcribes (from "Meet the Press" to 24-hour CNN coverage), wide-ranging hypertext access to program contents in a 500-channel universe remains elusive.

In the future, we will have a system that continuously monitors the text of closed captions for keywords (*IBM, Chapter 11,* or *wildcat strike*), whose occurrence would automatically trigger the recording of caption text and the associated video images, perhaps via a tape loop or direct downloading to a QuickTime file. With caption decoders now built in to most U.S. TV sets by law, it's only a matter of time before decoder chips become available for computers and before TVs come equipped with serial ports for downloading data.

Joe Clark is a Toronto writer who covers everything from music video to gay sports. He looks forward to the day when on-line information is free to everyone.

Table 1: An Information Sampler

Type of information	On-line service	Name	Keyword or path
Business			
Federal taxation	Internet	Federal Taxation/Accounting	FEDTAX-L@SHSU.BITNET
Investment decisions	America Online	Investor's Network	investors network
Stock market	CompuServe	Current Market SNAPSHOT	GO SNAPSHOT
Computer			
Computer-industry news	America Online	Newsbytes	News & Finance Department>Newsbytes
Cross-platform compatibility	Internet	Software Review	SOFTREVU@BROWNVM.BROWN.EDU
Forums for Mac users	CompuServe	Apple Macintosh Forums	GO MACINTOSH
Education			
Encyclopedia	America Online	Compton's Encyclopedia	Encyclopedia
Library of Congress	America Online	Library of Congress Online	Library of Congress
Government	CompuServe	Government Publications	GO GPO
Health	CompuServe	Health Database Plus	GO HLTDB
Computers and health	Internet	Computing and Health	C+HEALTH@IUBVM.BITNET
Law and justice			
Business and law	Usenet	Lawsuits and Business	clari.biz.courts
Tax laws	Usenet	Tax Laws and Advice	misc.taxes
U.S. Supreme Court	Usenet	U.S. Supreme Court Rulings	clari.news.law.supreme
News and current events			
Business news	CompuServe	The Business Wire	GO TBW
Daily news	America Online	News Search	News search
Magazine articles	BRS After Dark	Magazine Index (library)	
Newspaper articles	CompuServe	Newspaper Library	GO NEWSLIB
Publications	CompuServe	Book Review Digest	GO BOOKREVIEW
Technology			
Macs	The Well	Macintosh Technical	(g mactech)
News and tips for IS managers	NewsNet	Information Week	

Table 1: On-line services provide databases on everything from news articles to a conference on police dogs. This sampling of services and forums, focused on business, are from Don Rittner's *Whole Earth Online Almanac,* published by Brady. The book contains many more listings as well as descriptions of each on-line service.

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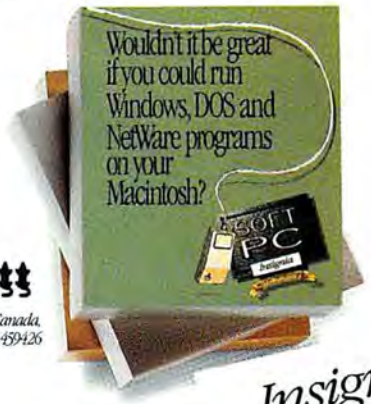

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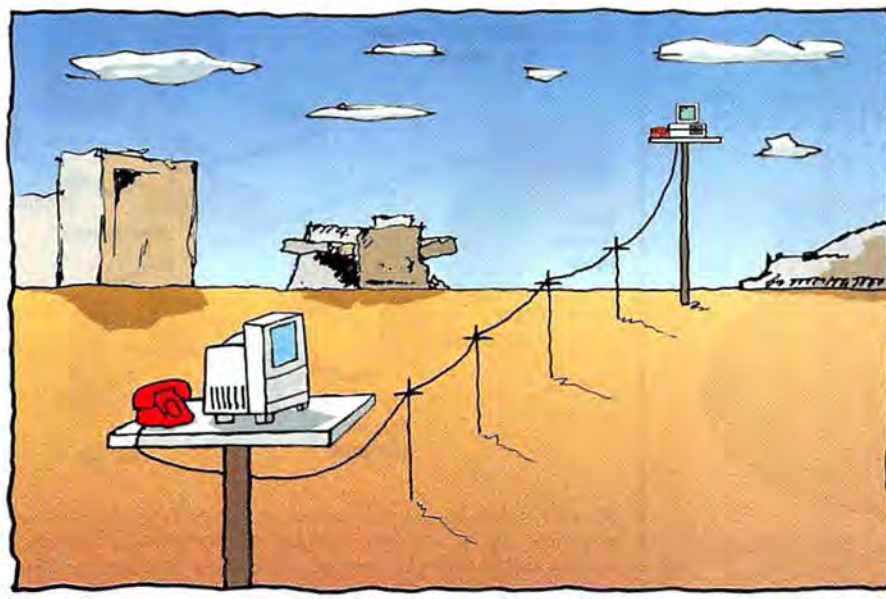
Dial-In Dilemmas



Whether you're calling a PC to retrieve a file or dialing in to a network, cross-platform remote connections let you work at a distance. But they aren't always easy.

By John Rizzo

At a time when data speaks louder than words, many of us are more likely to reach out and touch someone by using a computer and modem than by using a telephone handset. But if the two computers you're linking are a Mac and a PC, you're in for trouble.

Sending messages and files between a Mac and a PC over a telephone line can be trying and is nowhere near as easy as it is from Mac to Mac or even from PC to PC. The computer-language barriers that have been bridged in cross-platform networking software often still exist in cross-platform telecommunications, as do the ugly technical details users are forced to learn. Fortunately, with the right information and some trial and error in the setup, you can make Mac-to-PC telecommuting part of your daily routine.

Transmitting data over a telephone line can take three major forms: a direct Mac-to-PC link, an intermediary on-line e-mail service, and a Mac-to-PC network link. Each method offers trade-offs in cost, ease of use, and what you can do.

Direct Dialing

The best thing about an old-fashioned direct dial-in connection is that you don't need anything exotic, just a modem and a general-purpose telecom application such as Smartcom, from Hayes Microcomputer Products; MicroPhone, from Software Ventures; or the shareware program ZTerm, available from on-line services and user groups. The type of modem each computer uses is almost irrelevant, because most modems can talk to each other. It also doesn't matter what telecom software the Mac and PC are running. However, for the Mac to make a link with a PC and to send or receive a file, both parties must set up their software carefully.

It helps to have separate modem and telephone lines, so you can talk to the other person while you're sending or receiving. The sender and receiver should use the same settings for the transmission rate; the number of bits per character (usually 8); and the error-checking scheme, called parity (usually off). The sender then dials the receiver's modem number and hopes for a connection.

To send a file after establishing a link with a PC, you need to specify a file-transfer protocol, which controls how the telecom software sends and receives files. The four common protocols for transferring files between Macs and PCs are Xmodem, Ymodem, Zmodem, and Kermit.

First try Xmodem, which automatically checks errors and corrects them by resending the incorrect portion of the file. Ymodem is a variation that allows multiple files per transmission. Zmodem offers the best speed and reliability, allowing the software to resume transmission if the link is broken in the middle of a file transfer. Kermit is a specialized protocol for moving 8-bit data in communication paths that allow only 7-bit data. Try Kermit if nothing else works when you're sending a file from a Mac to a PC.

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MAC TO PC

Figure 1: Cross-Platform Remote Access

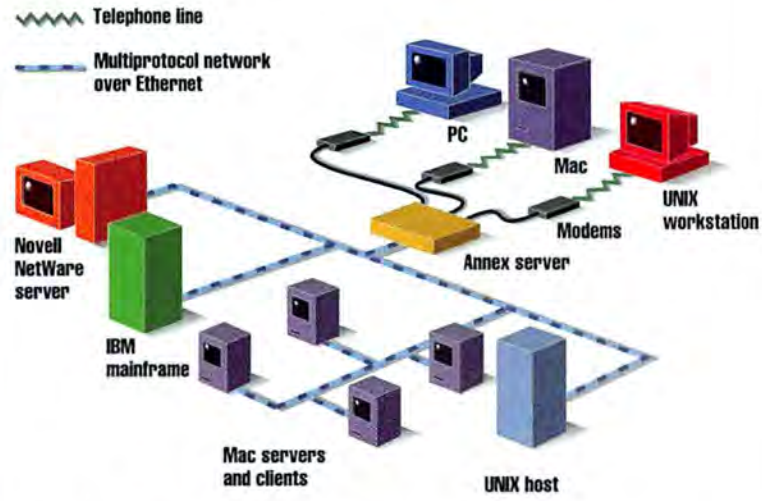


Figure 1: Although most remote-access servers support either Macs or PCs, the Annex line, from Xylogics, allows Macs, PCs, and UNIX workstations to simultaneously dial in to mixed networks to access a variety of hosts. Annex servers support ARA, TCP/IP, PPP, SNMP, and many other standards.

Sending a Mac file from a Mac to a PC requires a little extra care. Unlike PC files, Mac files consist of two electronic parts: a data fork and a resource fork. The data fork contains the bulk of the data, and the resource fork contains formatting information and the file's "Macness," such as its icon, type, and creator and Get Info text. PC telecom software can't recognize the two forks as one file, so you must use the transmission file format MacBinary, which combines the forks into one so that the file gets to the PC intact. If you're sending a PC file or want to transmit only the text portion of a Mac file (the data fork), you can use other telecom file formats such as binary or text.

A drawback of a direct phone link is that both parties usually must be at their computers at the same time to initiate the sending and receiving of a file. A more convenient method is to use an on-line service such as America Online or CompuServe — recipients don't have to be at the computer when you send a message and can recover it at their leisure, and you don't have to deal with file-transfer protocols or formats. Of course, both you and the recipient have to subscribe to the same service and pay the monthly fees.

Crossing Remote Lines

In an office, the most user-friendly way of remotely accessing a Mac or a PC is to establish a connection with a LAN (local-area network). You avoid most of the hassles of direct dial-in and on-line services when you establish a remote network connection between two machines. The interface is usually familiar and is graphical, at least for Mac users. Transferring a file is often simply a matter of clicking and dragging.

A network connection also gives you other capabilities, letting you rummage through a hard disk or file server in search of a file you forgot to bring with you. You may also be able to use the network's printers, e-mail, scheduling programs, and other network services.

Between two Macs or two PCs, remote network dial-in is a snap. Mac users can use Apple's ARA (AppleTalk Remote Access), which establishes a link to an AppleTalk network.

Although there is no ARA for PCs, PC networks often have PC remote-access capabilities built in to the server (the capabilities are not always available to Macs, however). Because most PC network operating systems support Macs by running AppleTalk on a Mac network segment, Macs can access PC servers by

dialing in to a Mac that's running ARA. This goes for any PC server volume that can be mounted on a Mac desktop.

For Mac or PC users to access PCs on an AppleTalk network, the network must have a network modem. The PCs need software such as Farallon's Timbuktu as well as an Ethernet or LocalTalk card. Timbuktu gives you complete or limited access to a PC hard disk.

A remote-access server — a box with multiple modem ports on one end and a network connection on the other — is practical when many users are accessing a PC or Mac network remotely. There are numerous remote-access servers: the LanRover series ($1,661 for a 1-modem-port server to $2,999 for an 8-port server), from Shiva (617-270-8300); the 3-port GatorLink ($1,495), from Cayman (617-494-1999); and the NetBlazer line ($2,299 to $4,599 for as many as 26 ports), from Telebit (408-734-4333), to mention a few. Unfortunately, none of these boxes let a Macintosh access a PC network or a PC access an AppleTalk network. For instance, Shiva offers one LanRover that lets Macs dial in to AppleTalk networks and another that lets PCs dial in to NetWare networks.

Practical network links between one Mac and one PC don't exist.

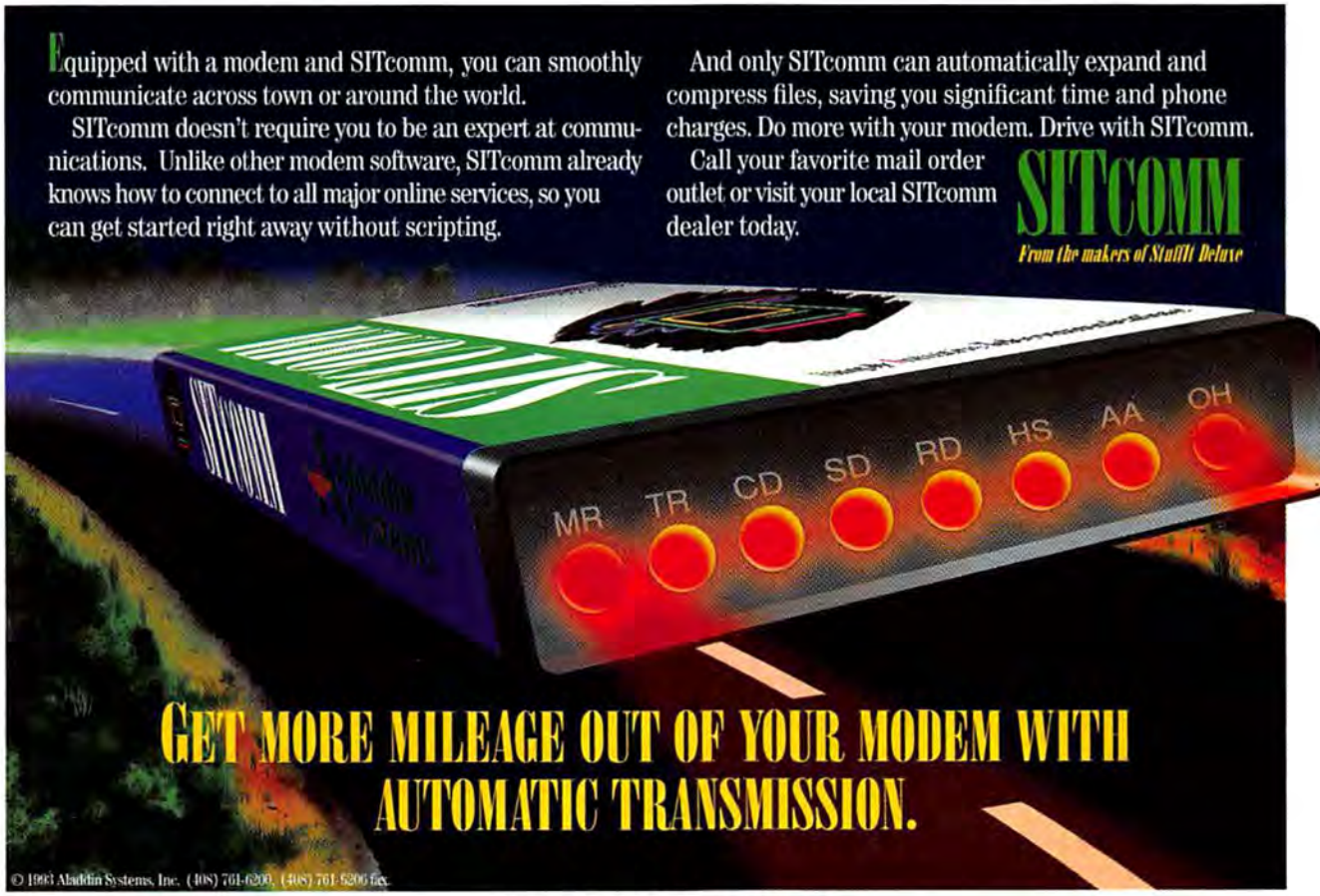
The products in the Annex line ($2,195 to $7,995), from Xylogics (617-272-8140), are the first to offer true cross-platform remote access. Annex servers let Macs, PCs, and UNIX machines dial in to a multiprotocol network at the same time. The Annex line supports ARA, for Macs and AppleTalk networks; TCP/IP, IP routing, and SLIP, for UNIX networks; LAT, for the VAX DECnet world; and PPP (point-to-point protocol), which is used in a variety of PC networks. It also supports dialing in to IBM mainframe and UNIX hosts. The various Annex models support 8 to 84 modems each.

A Long Way to Go

Practical network links between one Mac and one PC don't exist. If you want to use a PowerBook to dial in to a single PC, for instance, the PC must have a network modem, a network card, and Timbuktu — a costly combination.

Why is telecommunications, one of the earliest forms of computer communications, still so lacking when it comes to Macs and PCs? For starters, telecom-software developers produce some of the most user-unfriendly software around. And then there's Apple, which hasn't created a version of ARA for PCs. Most product vendors haven't grasped that many organizations — and many users — have Macs as well as PCs. I recently asked Shiva how to create a remote-network link between a PowerBook and a single PC. The representative's response: "Buy a Windows laptop."

***MacUser* technical editor John Rizzo is the author of *How Macs Work* and *MacUser Guide to Connectivity*, both published by Ziff-Davis Press.**



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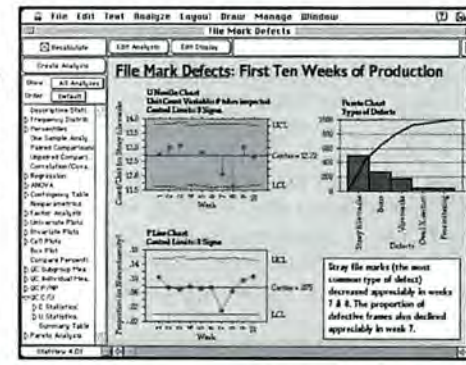
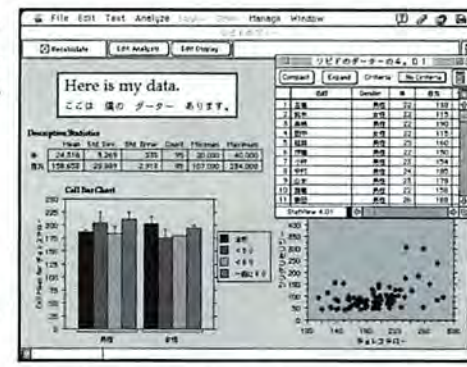
StatView retails for $595 (U.S.), and QC Tools is available for an additional $245 (U.S.). Special StatView 4.0/QC Tools Bundle pricing is available — call us at **1-800-666-STAT** for details.



Like graphical macros, StatView's templates make it easy for anyone — from novices to experts — to perform complex suites of QC analyses and produce high-quality reports.



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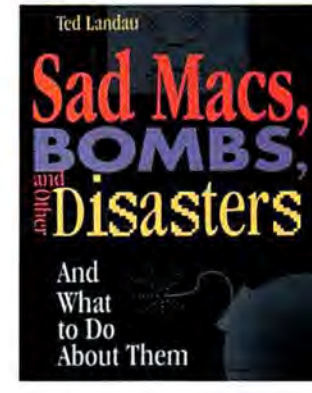
Taxing matters: Yes, tax time is coming, so start digging out those receipts. And while you're at it, check out the MacInTax Tax Savings Guide ($19.95), from ChipSoft. It gives you more than **250 tax-saving tips.** You can either read all the tips or complete a questionnaire and then read only those tips that apply. (Note: This program is aimed at people who *don't* do their taxes themselves.) For those who still don't understand the changes in the tax law, ChipSoft has introduced the TurboTax Tax Planner ($29.95), which lets you **forecast your tax bill** over the next five years. You can develop several scenarios and then compare the results. 800-964-1040 or 619-453-4446.

Background printing: Here are a few ways to add a watermark to a document if you want people to know they're getting a draft copy or **confidential material.** Working Software's Working Watermarker ($49.95) adds a control to the Mac's Print dialog box that lets you print a graphic image (your company's logo, for example) or message "underneath" the document being printed. Alki Software's MasterWord ($99.95), a utility that adds a fuller-featured tool bar to Word 5.0 and later, lets you place watermark phrases (but not graphics) behind Word documents. Working Software, 408-423-5696; Alki, 800-669-9673 or 206-286-2600.

Power Books: Sick of being the resident Macintosh guru whenever a colleague's Mac crashes? If so, grab a few copies of Addison-Wesley's trouble-shooting guide **Sad Macs, Bombs, and Other Disasters,** by Ted Landau, and present them to all the new Mac users you know. With any luck, you'll be rewarded with a little peace and quiet. 617-944-3700. $24.95.



By Victoria von Biel

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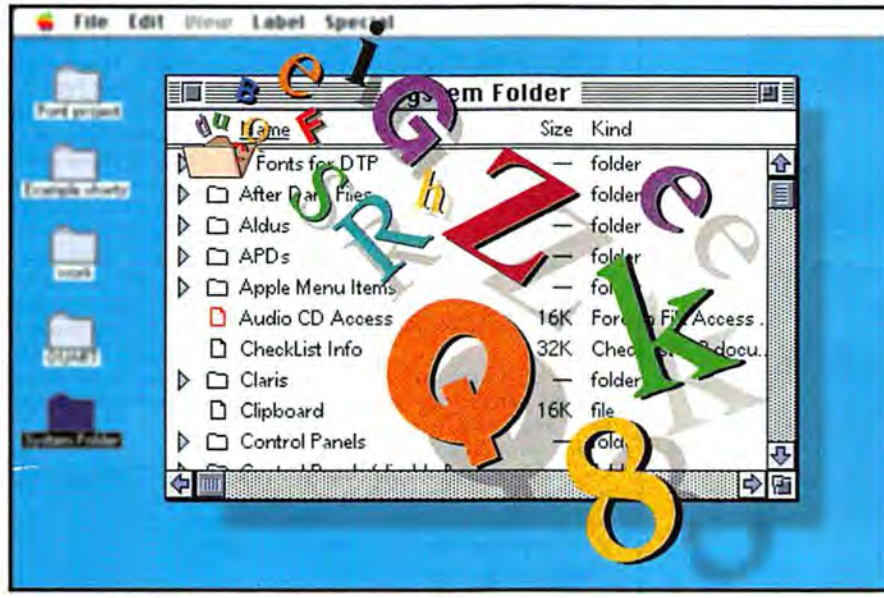
CIRCLE 158 ON READER SERVICE CARD.

Hassle-Free Fonts



Baffled by bit maps? Troubled by TrueType? Here are some practical tips for straightening out your Fonts folder.

By Gregory Wasson

Most Mac users love fonts — and for good reason. You can build an impressive collection of fonts without spending too much, and the Mac's WYSIWYG interface lets them enliven your screen as well as your documents. The only problem is managing them. The more fonts you have, the more problems you're likely to have. And although System 7.1's Fonts folder has simplified some aspects of font management (at least all of your fonts are in one place), it hasn't fixed everything. Here are some tips and techniques that can help you make those fonts behave.

Choose Between TrueType and Type 1

In the old days, fonts were nice and simple. You used bit-mapped fonts, and you used text only in point sizes you had installed (or endured jaggy characters). Bit-mapped fonts came in suitcases, you installed them in the system with Font/DA Mover, and that was that. Then along came Type 1 (and briefly, Type 3) PostScript fonts and ATM (Adobe Type Manager). Now you had to deal with printer, or outline, fonts *as well as* bit-mapped, or screen, fonts. And then Apple and Microsoft introduced yet another font "standard," called TrueType, which really made a confusing stew of things. Most Macs and Apple printers come with TrueType fonts that likely duplicate Type 1 fonts you already have installed on your Mac (see Figure 1 for a quick and easy way of telling which of your fonts are Type 1 and which are TrueType).

So should you stick with TrueType or switch to Type 1? If you use a QuickDraw (non-PostScript) printer, TrueType is probably all you need. But if you print to a PostScript printer or send documents out to a service bureau, you should seriously think about leaving TrueType behind. Using TrueType fonts and printing to a PostScript device is possible, but that can make for slow printing. Also, many bureaus still don't accept print jobs that contain TrueType fonts.

Whichever font technology you choose, stick with it and don't be tempted to mix and match (although even if you standardize on Type 1 fonts, you must keep the Apple system TrueType fonts — Chicago, Geneva, Monaco, and New York — installed). Especially avoid having TrueType and Type 1 versions of the same font around, because this can cause printing problems. Many printer-software installer programs, especially those from Apple, automatically install TrueType fonts along with the printer driver. To avoid confusion, always do a custom install and specify that the TrueType fonts not be installed if you have already adopted the Type 1 and ATM approach.

Tame the Font Menu

Here's a tip for Type 1 users: As you increase your collection of fonts, you'll begin to notice something about the Font menu in your applications that will dismay you. It grows. It may well become unwieldy and force you to scroll great

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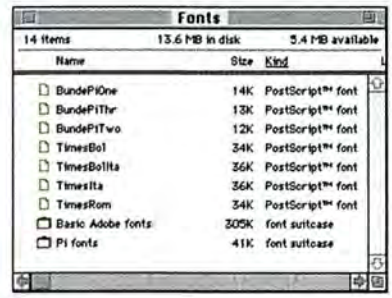
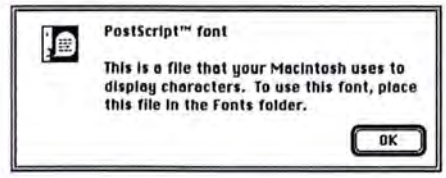
Figure 1: TrueType or PostScript?

Figure 1: System 7 mixes up all your fonts in the System Folder or the Fonts folder, so how can you distinguish between TrueType and PostScript fonts?



Here are some clues:

- Look at an application's Font menu: TrueType fonts usually appear at all the installed point sizes whereas Type 1 fonts typically appear at only a few installed point sizes. Just select some text, and look at the menu that shows point sizes (this doesn't work with Microsoft applications).
- Type 1 printer fonts are stored separately from their corresponding screen fonts. If you're looking at a folder full of fonts and trying to sort them all out, go to the Finder's View menu and view the folder by kind. The Type 1 printer fonts will all be grouped and labeled "PostScript™ font" in the Kind column.
- You can double-click on any printer font under System 7 and immediately see whether it is Type 1 or TrueType. A Type 1 printer font has a message saying it is a PostScript font. A TrueType printer font appears in sample displays at 9, 12, and 18 points.



distances to select the font you want. You'll find yourself avoiding Zapf Dingbats because it just takes too long to get to it.

Fortunately, an easy solution is available in the form of some commercial products that shorten the Font menu by consolidating members of the same font family (such as Times Roman, Times Bold, Times Italic, and Times Bold Italic) under one name on the menu rather than under several separate names (some Type 1 font families have eight or more members!). You access a specific member of a font family on a submenu that pops up from the main font entry. WYSIWYG Menus (part of the System 7-only Now Utilities) and ATR (Adobe Type Reunion) are the two leading Font-menu consolidators.

If you stick to TrueType fonts, you won't need this kind of utility, because TrueType font families aren't as complex as Type 1's and display only one font name on the Font menu anyway.

Understand the Fonts Folder

After you've installed System 7.1, you may find that some of your fonts have disappeared. Or you may encounter mysterious installation problems if you have a lot of fonts when you install the system software. Why? System 7.1 introduced a limitation along with its handy Fonts folder: The folder can contain only 128 files. That may sound like a lot, but Macs in service bureaus and graphic-design environments can easily have that many screen- and printer-font files crowding into the System Folder. Many people have individual suitcases for each font, and they add up.

You can work around the limitation by consolidating your screen fonts into a smaller number of font suitcases so that you have fewer files loose in the Fonts folder. System 7.1 counts files, not fonts, so you can have 50 screen fonts in a single suitcase, but the system will see just one file. For more on the Fonts folder, see the "Fonts Folder Tune Up" sidebar.

A Software Solution

Having a lot of fonts installed can be great fun, but they put a strain on the system's resources and can actually slow down some programs and your Mac's startup speed. It's a good idea to minimize the number of fonts you have permanently installed and to move other fonts into your system only as needed.

If font juggling is a common chore for you, consider using a font-management program such as Fifth Generation's Suitcase II (you'll need version 2.1.3 if you've installed System 7.1). This extension lets you store fonts outside the System Folder and load and unload single fonts or entire collections of fonts at any time. It's easier than dealing with Font/DA Mover (under System 6) or even with System 7.1's Fonts folder if you have to move fonts in and out frequently.

Under System 7, Font/DA Mover is no longer used. So how do you create an empty suitcase should you ever need one? Just search your Mac's hard disk, and find a font suitcase. There should be one in your System Folder; in the Extensions folder; or if you've installed System 7.1, in the Fonts folder. Make a copy of it, and double-click on it to open it. Trash all the files in the suitcase, and rename the suitcase. Whenever you need a suitcase, copy this empty one and rename the copy.

Keep these tips in mind the next time you add just one more font to your Fonts folder. Once you get a handle on your fonts, you can spend more time being creative *and* productive.

Gregory Wasson is a *MacUser* contributing editor who writes frequently on DTP topics.

Figure 2: For those who have too many Type 1 fonts installed, utilities such as Adobe Type Reunion or WYSIWYG Menus can make the Font menu shorter.

Fonts Folder Tune Up

If you use System 7.1 and seldom change your font configuration, you probably don't need a font-management utility such as Suitcase, which can eat up memory. Instead, try reorganizing your Fonts folder. Here are some guidelines:

- **Consolidate your screen fonts** (also known as bit-mapped fonts) into half a dozen logically named suitcases within the Fonts folder — Display Fonts, Basic Adobe Fonts, Pi Fonts, and so on. Make sure the corresponding printer fonts are loose in the Fonts folder as well. If you use ATM, keep only one or two point sizes of each screen font — say, 10 and 12 point. ATM can create the other point sizes for you on the fly, and you can free up hundreds of kilobytes by stripping out unnecessary screen fonts.
- **Create a folder called Unused Fonts** within the Fonts folder, and use it for storing suitcased screen fonts you don't absolutely need to have installed all the time. Leave the corresponding printer fonts in the Fonts folder. If you need to use one of these uninstalled fonts, just drag the appropriate suitcase back into the Fonts folder.
- **Make an alias of the Fonts folder,** and place it in the Apple Menu Items folder so you can access the Fonts folder from the Apple menu without opening the System Folder.
- **Get ATM 3.0** if you've just upgraded to System 7.1 and find that your Type 1 fonts are jaggy. Version 3.0 is the first version of ATM that recognizes the new Fonts folder. If you cannot upgrade your copy of ATM immediately, try this instead: Drag the printer fonts from the Fonts folder (where the System 7.1 installer moved them) to the Extensions folder, or leave them loose in the System Folder. (To tell which files in the Fonts folder are printer fonts, view by kind; all the PostScript fonts will be so named and will be grouped.)

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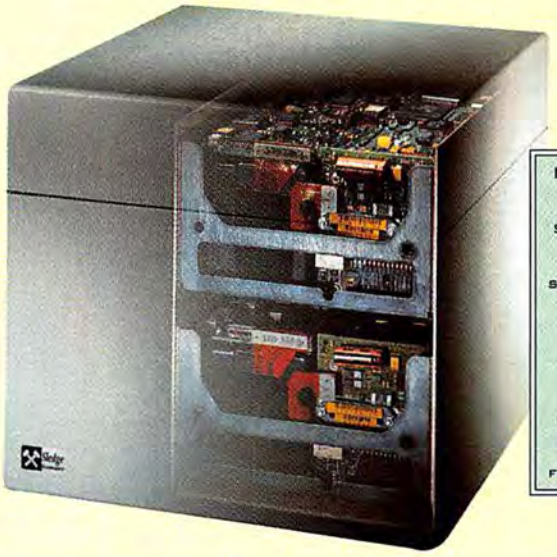

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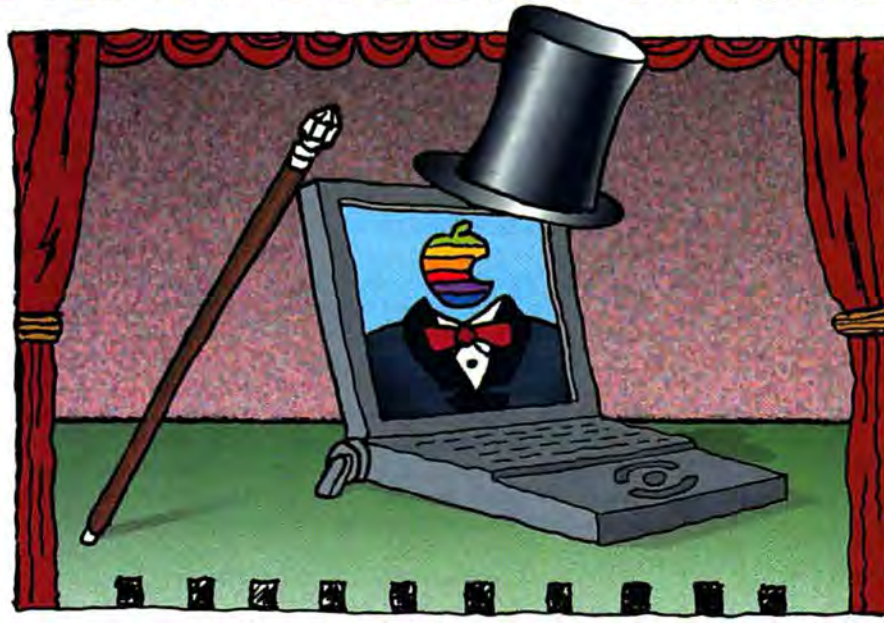
CIRCLE 71 ON READER SERVICE CARD.

A Well-Dressed PowerBook



Buy your PowerBook a present or two this holiday season. The best present of all might be one that triples your usual battery time.

By Sharon Zardetto Aker

Whether you're celebrating the 12 days of Christmas or the 8 days of Hanukkah or just need a little midwinter pick-me-up, this is an excellent time to accessorize your PowerBook. Why not consider buying yourself something you don't actually need but want — if only because it will make life a little easier? Here are a few suggestions:

• Buy a second carrying case. One case is a necessity, and the second is a convenience. The trick is to buy a *different* second case. Is your current carrying case little more than a slip cover that barely accommodates your PowerBook and a power adapter? Get another case that carries a lot more stuff. Look for inside pockets that hold disks, a spare battery, the power cord, and maybe a stack of business cards. Also, look for large outside pockets, one of which should have accordion sides to accommodate papers, magazines, and perhaps a book. If you already have a large carrying case, get a smaller one for short trips.

PowerBook carrying cases range from $40 to $250. Among the vendors you should consider are WraP (800-883-9727 or 415-327-7900), Silicon Sports (800-243-2972 or 415-327-7900), Kensington (800-535-4242 or 415-572-2700), The Madson Line (800-851-1551 or 415-927-3600), and Apple (800-776-2333 or 408-996-1010).

• Purchase an extra AC power adapter. You'll find it incredibly convenient to keep one cord permanently plugged in under your home or office desk and another packed in your carrying case, ready for travel. If you have an all-in-one PowerBook (anything but a Duo) and you're going to buy an Apple power cord, make sure you get the latest, 24-watt adapter. It will fully charge your NiCad or lead-acid battery faster than the earlier models, no matter which PowerBook you own.

If you're traveling only domestically, you don't need a heavy universal power brick. Consider buying Kensington's new 5-ounce, 20-watt power adapter instead of the Apple standard adapter. Prices range from $65 to $99.

• Get a second battery and an external charger/conditioner. Charging two batteries at a time overnight doubles your available battery power on the road. Look for the latest Apple NiCad batteries (2.9 amp-hours), but don't buy the Apple recharger, because it doesn't recondition NiCads. Other chargers, such as those from Lind Electronic Design (800-659-5956 or 612-927-6303), also recondition NiCads by discharging them completely before recharging them. Look for a recharger that handles two batteries at a time. Later, add a third battery and charge two in the recharger while you use the third; if you have two power cords, you can charge the battery inside your PowerBook at the same time as you're using the recharger (Lind batteries are $70 each, rechargers are $90 each).

• If you're accustomed to using an extended keyboard, you

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CIRCLE 62 ON READER SERVICE CARD.

probably find the number keys on your PowerBook keyboard hard to reach. If you do a lot of numeric-data entry, splurge on a separate numeric keypad. Keypads designed for PowerBooks are low-power ADB devices that minimize the drain on your battery. As a bonus, you get the function keys you're used to on your desktop Macintosh's extended keyboard. Sophisticated Circuits (206-485-7979), Kensington, and PlusWare (800-268-7587 or 416-477-0015) each provide calculator software with their PowerBook keypads ($85 to $90).

• Get a dock even if you don't have a Duo. If you find you need to connect your PowerBook to your desktop Macintosh or office network, you can conveniently slide the PowerBook into a Pilot Technologies BookEndz system that's already holding all the cables and simply slide it out again when you're done. The dock design leaves the screen fully accessible. For those who have to use a BookEndz system on the road, the latest models come with an extension for the power cord so the PowerBook is not locked into the dock; if you already have a BookEndz system, you can get an extension by calling Pilot Technologies at 800-682-4987 or 612-828-6002. There are separate BookEndz models for PowerBooks with and without video-out and a slightly more expensive universal BookEndz that fits all PowerBooks ($129 to $144).

The Ultimate Aphrodisiac

When Henry Kissinger stated that power is the ultimate aphrodisiac, it's unlikely he had PowerBook batteries in mind. But if he did, he'd go crazy for ThinPack, from VST (508-287-4600), introduced at the Boston Macworld Expo last summer.

The ThinPack is a 1.5-pound, half-inch thick, external PowerBook battery. Its footprint is about half that of the

PowerBook Secrets: *Phone vs. Modem*

Your modem is an analog device; PBX phone systems in some hotels and other big complexes such as offices, hospitals, and universities are digital. If you attach your analog modem to a digital device, you'll likely experience serious problems — ranging from a modem that just won't work to one that actually gets fried.

So how can you determine if a phone system is digital? Here are a few tell-tale signs:

• If a telephone has a separate data port on its side, you can be fairly sure the phone system is digital — but you can still safely connect your modem to the data port.

• Digital systems generally accommodate fancy phones. Features above and beyond the basic keypad on the phone are a dead giveaway. On phones in some hotels, you can punch dedicated buttons for the laundry, valet services, or front desk.

• Check the underside of the phone. You may find a black sticker with silver labeling marked "DSG" or one that simply proclaims, "Not for direct connection/ Hotel use only." This is a digital phone.

• Certain brands of telephones are a tip-off: Rolm and Meridian are common digital brands.

• Ask the hotel manager if you can hook up a computer or fax machine. Even if the hotel staff members are not familiar with analog versus digital phone systems, they will probably be able to accommodate your request.

• Do what I do: Carry a cheap, two-dollar single-line phone tester, available from any electronics store. Connect it to the phone line, and if the LED glows green, it's an analog line. If the LED glows red or not at all (or if the tester melts, smokes, burns, or explodes), it's a digital line — or a bad analog line you don't want to mess with.

If you're stuck with a digital line and no data port for safe access, ask to use the line the hotel/office fax machine is attached to — virtually all fax machines are analog. Or plan ahead and pack a digital-to-analog adapter that goes between the handset and the base unit (the Konexx Koupler Model 203 from APS or TeleAdapt is compact), or take an old standby: an acoustic coupler. Both are available from various sources, including APS (800-233-7550 or 816-483-1600) and TeleAdapt (408-370-5105).

— Rich Wolfson

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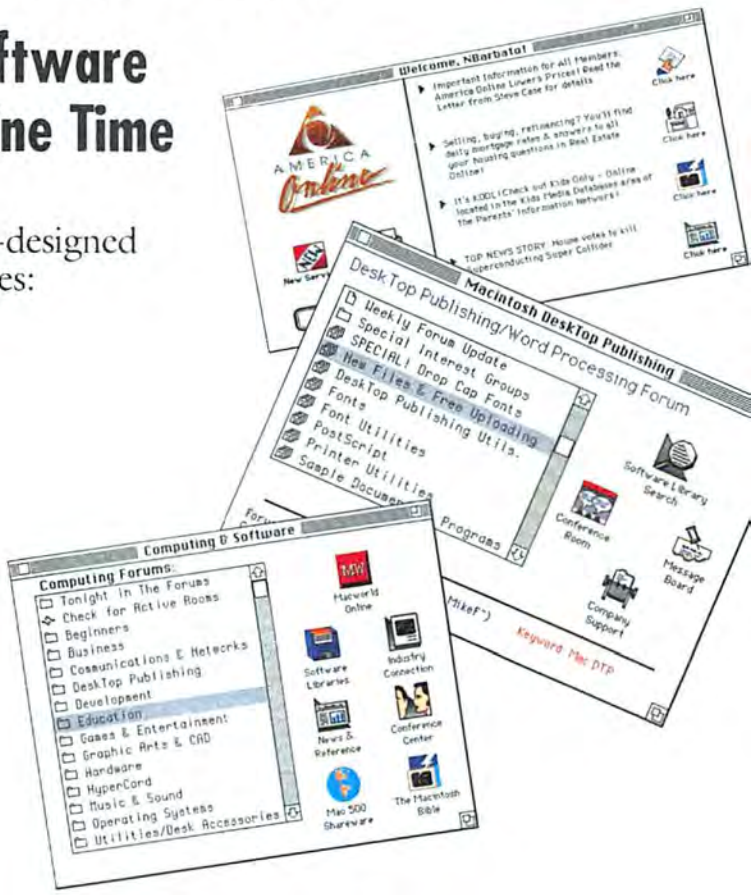

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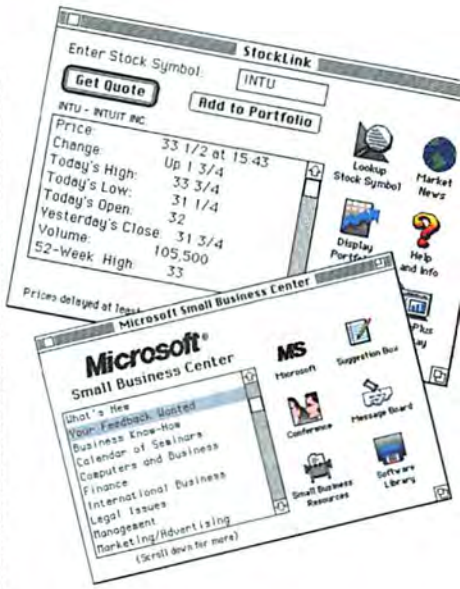

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PowerBook. (At press time, Technöggin [800-305-7936 or 513-321-1777] announced the PowerPlate line — products similar to the ThinPack — which the company claims can keep your PowerBook running three or five times as long as standard batteries.)

According to ZD Labs test results, the ThinPack more than doubles the duration of a PowerBook-battery charge. Using a standard 2.9A battery, our test PowerBook remained operational for almost 3 hours. Using a ThinPack battery extended PowerBook use to 6 hours, 40 minutes.

The ThinPack charges in 3 to 5 hours with the PowerBook's own AC adapter and connects to the PowerBook's power port. Instead of using standard, round PowerBook battery cells, the ThinPack uses square cells, which maximize the power the pack provides.

When I use a ThinPack in combination with a fully charged internal battery (which usually gives me about 2 hours of power on its own) on my PowerBook 170, I get more than 7 hours of power — and that's with above-average power consumption. PowerBook 180c users are reporting 3 hours and more of power when they use this setup.

According to ZD Labs test results, the ThinPack more than doubles the length of a PowerBook-battery charge. What's more, the ThinPack is a real bargain.

Because the PowerBook expects anything plugged in to its power port to be providing AC power, when you use an external battery, your PowerBook thinks it's plugged in but not charging and issues frequent warnings to that effect. At press time, VST was developing software that should solve that problem and even let you set the point at which you get low-battery warnings.

At $179, this battery costs a little more than — and weighs as much as — the two standard batteries you'd need for equivalent battery life. But with two extra batteries, you also need a two-slot recharger and a second power cord to recharge all three batteries at the same time — and standard-battery recharging takes longer. Also, if you use multiple internal batteries, you have to swap them in and out, which, for some PowerBooks, means shutting down.

Convenience aside, the ThinPack costs much less than two extra batteries when you consider the lifetime of each battery type: You get about 500 recharges per standard NiCad internal battery, whereas the ThinPack is rated at about 1,000 recharges. The ThinPack is a bargain.

Sharon Aker and Rich Wolfson are the authors of the second edition of *The PowerBook Companion*.

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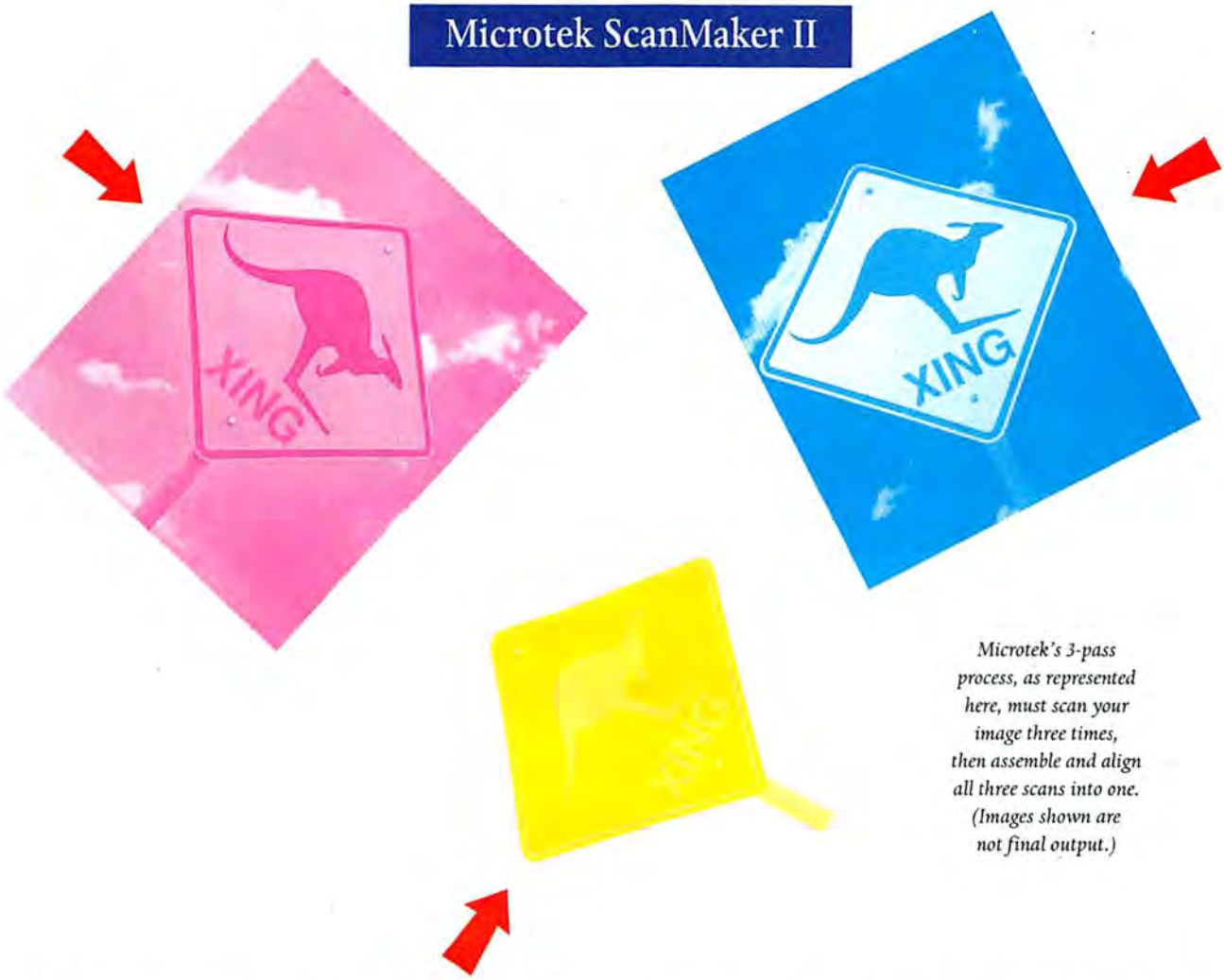

Microtek's 3-pass process, as represented here, must scan your image three times, then assemble and align all three scans into one. (Images shown are not final output.)

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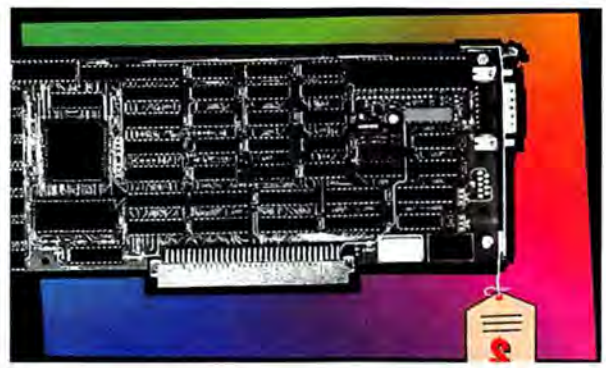
How to Buy

Video Cards



A video card is a bargain upgrade for your Mac: For less than $1,000, you can use a bigger monitor and view millions of colors.

■ Depending on what Mac model you have, there are two ways in which you can **see more colors** on your monitor and/or use a large-screen monitor. The cheaper method is to install more VRAM (video random-access memory); the second is to add a video card.

■ A 256K **VRAM chip** typically costs around $30. More VRAM gives your Mac increased color support, but VRAM is limited in the number of colors and sizes of the monitors it can support. Also, unlike some video cards, VRAM does not provide video acceleration.

■ **How much VRAM** you need depends on your monitor. The Quadra 610, 650, and 660AV each come with a minimum of 512K of VRAM, which allows you to run a 16-inch monitor with 8-bit color (256 colors). If you add 512K of VRAM (for about $50), you can use a monitor of the same size in 16-bit mode (thousands of colors). You can obtain a detailed chart from *MacUser*'s on-line service, ZiffNet/Mac, showing the minimum and maximum VRAM configurations of every Macintosh. Look in Library 7 of the Download & Support Forum (the QuickTime filename is SVMACS.SEA; the FileMaker Pro filename is DBMACS.SEA). The chart is also on AppleLink, under ZiffNet Selections: MacUser Software:Reference.

■ **How much color** do you need? 8-bit color is adequate for working with simple graphics such as charts. More-colorful documents, such as presentations using complex graphics and/or scanned photographs, demand at least 16-bit color.

■ Working with a color screen can be slow. Each time you scroll, zoom in or out, or click on a new window, the Mac and video card have to **update the screen** and redraw every pixel. A screen set to 24-bit color (millions of colors) takes considerably longer to update than one set to 16-bit. Likewise, 16-bit takes longer than 8-bit. That's where the video acceleration a video card provides can help.

■ Video cards featuring **QuickDraw acceleration** can actually double your monitor's redrawing speed. Accelerated-video cards are a lot faster and only slightly more expensive than standard video cards. If your work requires only 8-bit mode, a standard card will suffice. If you use higher screen resolutions, buy an accelerated-video card. (For a comparison of low-cost video cards, see "Affordable Color Upgrade," December '93, page 113.)

■ You can increase the overall speed of your Mac by installing a **CPU-accelerator card.** CPU accelerators are considerably more expensive than video cards, but you get a Macintosh that's faster overall, not just one with faster screen redrawing and increased color support.

■ If you plan to do much work with **QuickTime,** buy a video card that supports 16-bit color. Color-movie images are sharper and brighter in 16-bit mode than in 8-bit mode. However, it's virtually impossible to notice a difference in image quality between 16-bit and 24-bit, and you'll get faster frame rates if you set your screen to 16-bit rather than 24-bit color.

■ The monitor, not the video card, determines the sharpness and brightness of the display. So buy the best monitor, and buy an inexpensive accelerated-video card that supports your monitor's **timing and pixel resolution.** Vendors and dealers can show you a list of resolutions and timings their products support.

■ If prices vary only slightly, buy the card that offers the most **hardware and software features.** One useful feature is on-the-fly resolution switching, which lets you resize the screen image without restarting your Mac. Another useful feature is the ability to create a virtual desktop larger than the physical screen area. The E-Machines ColorLink cards also offer on-board Ethernet support.

■ **Shop around** for the best price. You may find a better deal if you buy a video card from one vendor and a monitor from another. If the resolution and timing match, card and monitor should be compatible. However, the only way to be sure is to attach the card and the monitor to a Mac before leaving the store. If you're buying via mail order, make sure you get a money-back guarantee.

By Nancy Peterson

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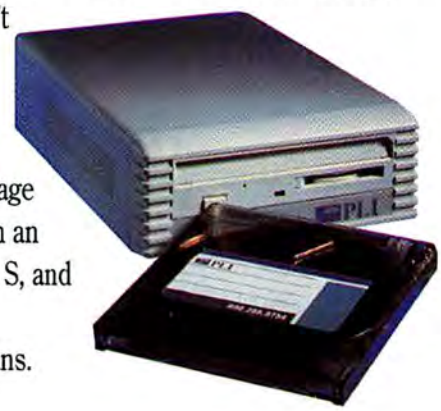

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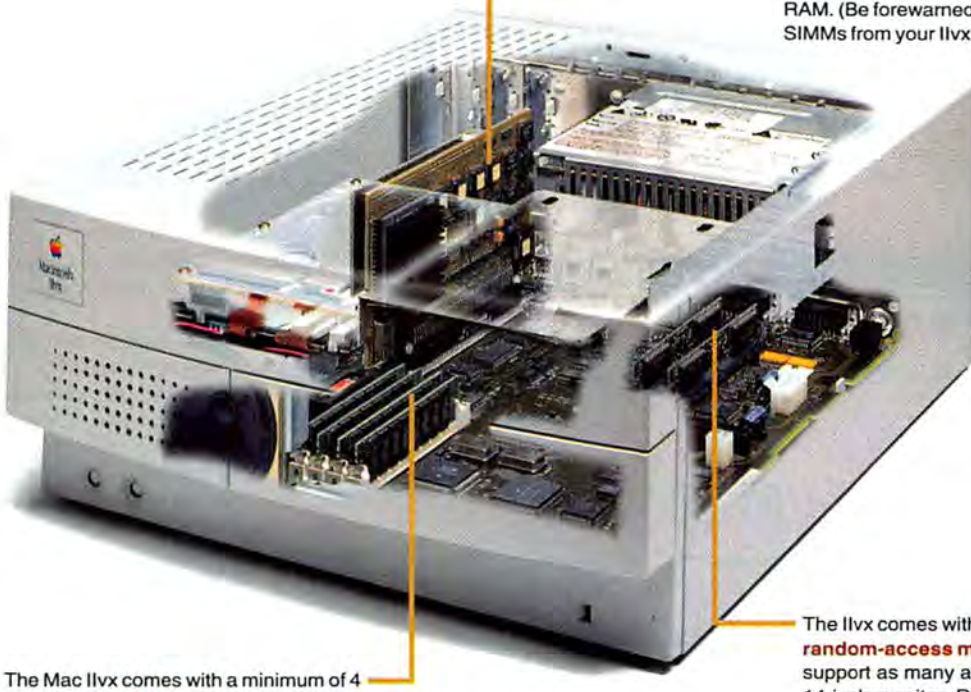
Upgrading the

Mac IIvx

Pushing the limits of your IIvx?
Here's a rundown on the best ways to upgrade.



You can turn your IIvx into a Quadra 650 with Apple's $1,600 logic-board upgrade, which includes Ethernet support and 8 megabytes of RAM. (Be forewarned: You can't transfer RAM SIMMs from your IIvx logic board to the upgrade board, because the upgrade board takes a different type of SIMM.) For $1,300 or less, you can get slightly better speed with DayStar Digital's 25-megahertz Turbo 040 **accelerator** with FastCache Turbo. You won't gain as much speed from 40- and 50-megahertz 68030 accelerators as you will from the logic-board upgrade or a 68040 accelerator, but the 68030 accelerators can cost several hundred dollars less.

The Mac IIvx comes with a minimum of 4 megabytes of **RAM**, plus four 30-pin SIMM slots that can accept 1-, 2-, 4-, 8-, or 16-megabyte SIMMs (80-nanosecond or faster). You can max out at 68 megabytes, although 20 megabytes (four 4-megabyte SIMMs added to the already supplied 4 megabytes) is sufficient for most users.

The IIvx comes with two 256K VRAM **(video random-access memory)** SIMMs, which support as many as 256 colors (8 bits) on a 14-inch monitor. Replacing those SIMMs with two 512K VRAM SIMMs gives you 32,768 colors (16 bits). (The IIvx with a CD-ROM drive installed comes with two 512K VRAM SIMMs.) If you want a larger monitor or 24-bit color (millions of colors), you need a video card. Prices start at around $500 for an accelerated-video card.

No Mac has raised as much ire in its owners as the Mac IIvx. Not because of the computer itself but because of what Apple did three months after its introduction — it released the Centris 650 (now called the Quadra 650), a faster Mac for the same price.

Market timing aside, the Mac IIvx is a good computer for most home, school, and business uses. (Except where indicated, all the information here applies also to the Performa 600, the mass-market rough equivalent of the IIvx.)

With a speedy 32-megahertz 68030 processor, the IIvx is slightly faster than the IIci and about twice as fast as the SE/30 or LC II. Besides being speedy, the IIvx is ready for expansion: It has three NuBus slots, one PDS (processor-direct slot), and room for a half-height 5.25-inch removable-media drive.

But the IIvx does have its limitations. If you do graphics, CAD (computer-aided design), video, or high-end desktop publishing, your IIvx needs a speed boost. Among Apple and third-party vendors, you have about four options.

1. For about $1,600, you can turn your IIvx into a Quadra 650 by installing a logic-board upgrade from Apple. The

By Tom Petaccia

upgrade includes a faster 68040 processor as well as 8 megabytes of RAM and support for Ethernet.

For the time being, Apple doesn't offer a Quadra 650 logic-board swap for Performas, although it may offer it in the future.

2. Apple intends to offer a PowerPC upgrade for the IIvx (at press time, Apple hadn't announced the upgrade's availability date). Although it will cost more than the Quadra 650 upgrade, a PowerPC upgrade will let you use software capabilities never before available on the Mac.

3. Third-party 68040 accelerators such as Applied Engineering's TransWarp 6400 (a 25-megahertz card that costs $999) provide about the same speed you get with the Quadra 650 upgrade. Some accelerators don't include Ethernet support or extra RAM, however.

4. A less expensive option is a 68030 accelerator, with prices beginning at less than $600. Because the IIvx comes with a 32-megahertz processor, you need to get a 40-megahertz or faster accelerator to see a speed increase.

One of the most practical and inexpensive ways to improve your IIvx is to add more memory, the bare minimum being a total of 8 megabytes. A total of 12 megabytes is better, and even then you risk getting "out of memory" messages, depending on the number of extensions you have and whether you run memory-hungry applications such as Photoshop. With 20 megabytes (four 4-megabyte SIMMs added to the IIvx's already installed 4 megabytes), you shouldn't have to worry about running out of RAM. Expect to pay around $650 for this much additional memory.

If you're running out of storage space on your hard disk, you have two options: Replace the internal drive (you'll spend about $350 for a 240-megabyte unit or $750 for 540 megabytes), or attach an external drive (add about $100 to internal-drive prices).

Making the most of your IIvx may mean selling it and buying a higher-end Mac. The upgrading options for the IIvx can range anywhere from $500 to $2,500. The price gets even higher if you want to add a removable-media device, high-end accelerator, or support for a monitor larger than 14 inches. By contrast, you can buy a faster 68040 Quadra 650 that includes 8 megabytes of RAM, a 230-megabyte hard drive, and support for a 21-inch monitor for around $2,000.

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With all those numbers being juggled from schedule to schedule, it's no wonder the figures are so often transcribed incorrectly or entered on the wrong line.

3 The Omitted Form
Even "ordinary" returns require anywhere from six to a dozen forms to complete. It's easy to miss one ... or end up rushing all over town to find the one you need.

4 The Misinterpreted Instruction
At best, IRS instructions can be tough to understand. At worst they can be mind-boggling. What you need are clear directions in plain English.

5 The Overlooked Deduction
You'd have to be a professional tax preparer to know all the deductions you're entitled to. If you miss just one, it could cost you hundreds of dollars.

6 The Exceeded Guideline
The fastest way to trigger an IRS audit is to exceed the "normal" range on one of your deductions. You need to know what the IRS looks for on a line-by-line basis.

When you do your taxes with MacInTax, mistakes like these are virtually impossible. And filing your taxes couldn't be easier.

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MacInTax is America's #1 best-selling tax software for the Macintosh -- over seven million returns were filed with MacInTax and TurboTax last year! With MacInTax on your Macintosh and the award-winning EasyStep® tax preparation process, you can completely and accurately prepare your income taxes in just a few hours.

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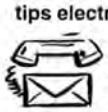
TIP SHEET

Nobody ever said you had to live in Cupertino to be a Macintosh expert. Know-it-alls are everywhere, from Manhattan to Malibu — even in Waldport, Oregon, where we found our own Mac guru, Philip Russell. Each month Phil shares his own tips plus the best from 70-odd Macintosh-user-group (MUG) magazines. But Phil can't do it alone. To all those whose undocumented Mac tip *MacUser* prints, we pay $25, and the Reader Tip of the Month earns $100.

Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically via



ZiffNet/Mac, the on-line service for *MacUser*. Send them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

By Philip Russell

Reader tips compiled by Gregory Wasson

■ Want more screen space for **Aldus PageMaker?** Turn scroll bars and page icons off and on by toggling Scroll Bars on the Windows menu. You can move from one page to another by pressing Command-Tab and Command-Shift-Tab, and you can scroll by holding down the Option key while dragging the mouse.

■ To convert a **MacDraw II** file to EPS format, ungroup the image and open the file, using Deneba's Canvas, version 2.1 or later. Using the File Format menu in the Save dialog box, convert the file into an Adobe Illustrator 1.1-compatible file. Load Adobe Illustrator, open a blank document, and import the converted file. Select all, and ungroup the elements that were grouped by the conversion. (Thanks, FatBits of the Ventura/Conejo, CA, MUG.)

■ How do you identify a **sick Finder** when your hard disk fails to boot? If you have Apple's Emergency System Disk, use it to boot your Mac. If the hard disk appears on the desktop, open an application, quit it, and eject the Emergency System Disk. If your Mac can manage this, it means the Finder is sick but the system is OK. (Thanks, AppleSac News.)

■ If your System disk will not start up your Mac, its **System Folder** is probably customized for another Mac model. For a System Folder that works on any Mac, use the installer's Any Mac choice when you install the system.

Reader Tips

Excel 4.0

To right-align a column of numbers in Microsoft Excel 4.0 so that positive numbers and negative numbers in parentheses align correctly, you can write a Format Number formula that ignores the parentheses and aligns a negative number, using the rightmost whole number. Here's how:

Select the Number submenu from the Format menu, and enter this code:

```
#,##0_);_M_M;(#,##0)_M_M
```

This tells Excel to leave a space the width of two *M* characters to the right of the numbers. To change the spacing, use more or fewer *M* characters in your code.

Nancy R. Gross
Olathe, KS

Works 3.0

I upgraded from Microsoft Works 2.0 to 3.0, and it took my Mac a long time to convert the files. You can perform the conversion quickly and easily by selecting all the files you want to convert and dragging them onto the Works 3.0 application icon.

Alex Rampell
Palm Beach, FL

Quadra 840AV

I recently bought a Quadra 840AV. When I tried to install a System Folder on my external hard drive by copying it off the CD-ROM bundled with my Mac, a dialog box popped up telling me I needed an additional 56 megabytes of hard-disk space to copy the files. That's when I discovered an invisible file hiding in the CD-ROM. It's a 98-megabyte QuickTime movie starring Apple's 840AV project team. Here's how to find the file so you can delete it:

Drag the Preferences folder from the CD-ROM to a hard disk with 110 megabytes of free space. Launch ResEdit or a file editor — such as DiskTop — and look in the Preferences folder for a file called Our Gang. Make this

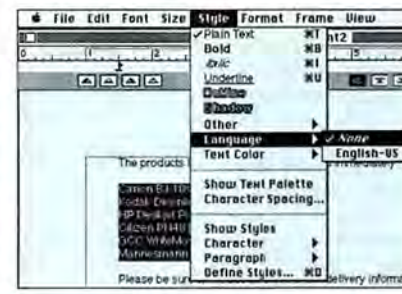
Tip of the Month: MacWrite Pro

One of MacWrite Pro's most powerful features is the None text attribute, on the Style menu's Language submenu. Text assigned the None attribute is ignored by MacWrite Pro's spelling checker. Simply apply the None attribute to any block of text — such as programming code or foreign-language quotations — that you don't need spell-checked. This can speed up the spell-checking process considerably.

Because MacWrite Pro supports character as well as paragraph styles, you can apply the None attribute to certain fonts and point sizes. You can also set single words within a paragraph to be ignored during spell checking.

In addition, the None attribute lets you protect single words or blocks of text before finding and replacing.

Kathy McCord
Capitola, CA



file visible. When you return to the desktop, you'll find the QuickTime-movie file in the Preferences folder. Delete the file.

David Dibbern
Thornton, CO

QuicKeys and Word

Here's a QuicKeys (versions 2.1 and later) tip for Microsoft Word users who use Word's Work menu: Instead of using the Open command and wading through dialog boxes to find a glossary, you can create a shortcut, using QuicKeys' Apple-events extension. Here's how:

1. Launch QuicKeys, and select Extensions from the Define menu.

2. Select Apple events.

3. When the Apple-events dialog box appears, name your QuicKey, and then assign it a keystroke.

4. Select Microsoft Word from the Send Events menu, and then select Open Documents from the Events menu.

5. When the Parameter box appears, double-click on Direct Parameter.

6. This brings up the Parameter Number: x dialog box. From its pull-down menu (its default choice is File List), select File.

7. When the Open dialog box appears, locate the glossary that corresponds to the Work menu you've created in Word, and click on Open.

8. Last, click on OK to save your new QuicKey and quit the program. To activate your Work menu, press the newly assigned key.

William P. Krauthammer
Miami, FL

System 7 Alarm Clock

A simple way to have the time always available without displaying it on the menu bar is to open the Apple Menu Items folder, in the System Folder, and make an alias of the Alarm Clock. Drag the alias to the Startup Items folder (also in the System Folder). Now, every time you boot your Mac, the time automatically appears just above the icon of your hard disk, ready to be moved for better placement.

Ray A. Brinker
Toledo, OH

Thunder 7

If you're using a Mac with a microphone, Thunder 7 can let you know the type of mistake you're making the moment you make it. Open the Sound control panel, and make recordings of yourself saying the name of each error Thunder 7 can recognize. Link that recorded sound to the appropriate type of error in Thunder 7. For example, instead of a *boing* sound, the next time you misspell a word, you'll hear an unambiguous "misspelled," in your own voice.

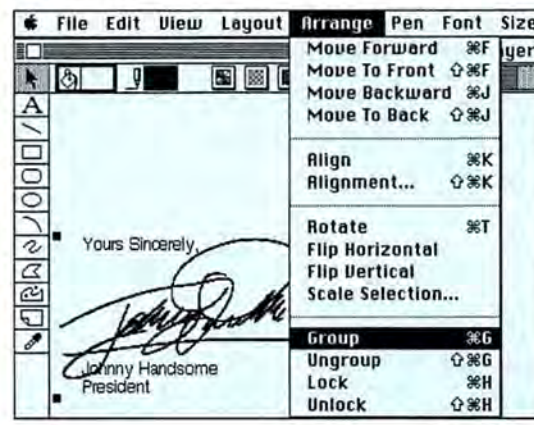
John Rowe
Raleigh, NC

Signatures

Making a scan of your signature and pasting it into documents helps you avoid the need to sign every page you print. This is especially handy for sending faxes directly from your Mac.

Here's how to make an authentic-looking digital signature: After scanning your signature, import it into a draw program (I use ClarisWorks in graphics mode). Create one text element of your favorite closing — such as "Yours sincerely," — and another of your name. Position these elements above and below your signature, using whatever degree of overlap you need in order to make it look authentic. Then group all the elements, copy the group to the Clipboard, and paste it into your Scrapbook.

Matthew C. Haines
Burbank, CA



Excel 4.0

You can create Excel macros to help you tabulate survey results. Here's how:

1. Choose New from the File menu, and click on Macro.

2. Type in the macro exactly as shown here.

3. Click on cell B2, and choose Define Name from the Formula menu. Click on Add and then on OK.

4. Click on cell B7, and repeat the process. Do the same with cell B10.

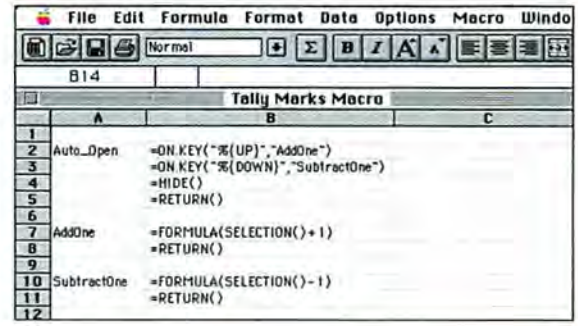
5. Choose Save from the File menu, and save the macro as Tally Marks Macro. Quit Excel.

To tabulate, double-click on the Tally Marks Macro icon in the Finder, which launches Excel and loads the macro. (You need to do this once each time you load Excel and want to use the tally-mark features.) The Tally Marks Macro spreadsheet closes automatically after a few seconds.

Use the arrow keys within the Excel document to move to any blank cell or cell containing a number. Press Option–up-arrow to add 1 to the tally. Press Option–down-arrow to subtract 1 from the tally.

It's much easier than trying to remember the previous number, adding or subtracting 1, and typing in the new number.

Tim Cimbura
Fridley, MN



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So basically, if your Mac has a virus, SAM will detect it, get rid of it and repair the file. And if your Mac is virus-free, SAM will help to make sure it stays that way. Because it monitors your Mac transparently, working behind the scenes, and only interrupting when a virus is found.

What's more, SAM is simple to install on a Macintosh networking* system, as well as a single-user Mac. All you need to do is load the program disk, double-click on the Installer Icon and let SAM handle the rest.

For the most anti-viral protection, pick up SAM 3.5 at your local retailer. It's the most popular anti-virus program in the world, and will keep you from ever having to deal with this ugly crime. Or these ugly criminals.

Winner of the 1993 MacWorld World Class Award.

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HELP FOLDER

Questions, anyone? Here's where to get answers from the experts. Bob LeVitus and Andy Ihnatko are the authors of the best-selling *Dr. Macintosh's Guide to the On-Line Universe.* Andy Ihnatko is also a longtime activist with BCS•Mac. They're ready to answer your questions about everything Macintosh. Write to Help Folder, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Don't want to wait for an answer? Post your question on ZiffNet/Mac, *MacUser*'s on-line service, and get a reply from Bob (76004,2076), Andy (72511,204), or one of the other *MacUser* experts. See the masthead in this issue for instructions on how to sign up.

By Bob LeVitus and Andy Ihnatko

PowerPC to the People

Q. I'm ready to replace my long-outdated Mac but feel paralyzed because everyone keeps telling me about the new PowerPC-based computer Apple will release in 1994. Do you think I should wait before buying a new Mac?

Valerie Russo
Seattle, WA

Andy: The PowerPC isn't really a new computer design — it's a *microprocessor* design produced by Apple, Motorola, and IBM. Like most hot new CPUs, the PowerPC chip is based on RISC (reduced-instruction-set computing), which means that instead of having a wheelbarrowful of highly specialized functions that run slowly, the processor knows only a few simple instructions, which it executes with blinding speed and uses in many flexible ways. RISC-based processors generally kick the butts of processors based on CISC (complex-instruction-set computing), such as those that are currently used in Macs and DOS machines.

Because of the speediness of a PowerPC-based Macintosh, applications such as voice recognition, telephony (which enables you to make use of your Macintosh for telephone functions), video, and complex data analysis and enhancement are going to run fast enough on one to be practical for common use.

Although most folks will stick to running Apple's System 7, a PowerPC Mac will support other operating systems. IBM will produce a version of OS/2 that can run on a PowerPC-based machine. Both IBM and Apple will create UNIX-based operating systems that will allow you to run UNIX applications on a PowerPC Mac.

There is most definitely a PowerPC in your future. It's generally accepted that all of Apple's midlevel to high-end Macs to come will be based on PowerPC chips and that, within four or five years, Apple will cease manufacturing 68000-family Macs.

High Time for On-Line

Q. I really don't understand what an on-line service is. What does it give me? How much does it cost? Will I have to pay fees in addition to my monthly subscription rate? Does *MacUser*'s ZiffNet/Mac cost anything if I have a local access number?

Mathieu Langlois
Mont-Royal, PQ
Canada

Bob: An on-line service is a computer your Mac can connect to via modem. You can send and receive messages about a wide variety of topics, including, but not limited to, computers. You're likely to find answers on-line to just about any question (see Figure 1).

The second major benefit of on-line services is their huge file libraries, filled with shareware, freeware, and demos of programs you can download to your Mac.

Costs vary from service to service. America Online's monthly fee of $9.95 includes five hours of connect time;

*. . . But Were Afraid to Ask

Every month I use this space to convince you that there are times when simpler is better. I mean, look at me right now as I write this — alone in my room with my thoughts, contemplating life's parade while watching the entire *Star Wars* saga on THX-certified laserdiscs in full four-channel Dolby Surround. It's these simpler moments that lead us to conclude that life, or the closest facsimile we've managed to come up with, is good.

Tap into those good vibrations along with me, will you? Send in a simple, basic, or weird question. To protect your identity, I'll say the question was posed by a character who can be seen in the background of the *Star Wars* set.

Q. How do you make screen shots for your column? I know all about pressing Command-Shift-3 (the system's built-in screen-shot Fkey), but it doesn't let you take a shot with pull-down menus or customize it in any other way. What's the trick?

Greedo
Tatooine

Andy: There *is* a way to get the built-in screen-shot Fkey to take a shot with pull-down menus intact. Unfortunately, it's a five-step procedure involving Macsbug (Apple's debugging software you can get free from on-line services) — hardly a tidy solution. It's better to install a system extension for screen shots. For years, my favorite was Nobu Toge's shareware Flash-It (available from your local user group and on-line services such as ZiffNet/Mac, *MacUser*'s on-line service). It can take a shot of whatever's on the screen. It also can save screen images to the Clipboard for handy pasting. Unlike the Apple method, Flash-It offers the space-age technology of actually letting you name the screen image when you save it. Given its measly $15 shareware fee, it belongs in every System Folder.

If you really want to customize images, you need a program such as Screenshot ($59.95) or Exposure Pro ($139.95), from Baseline Publishing (800-926-9677 or 901-682-9676), or Capture ($129.95), from Mainstay (818-991-6540). All three programs let you include elements such as pull-down menus, cursors, and dialog boxes in a screen shot. Personally, I have eyes only for Exposure Pro, because of its MacPaint-like editing palette, which lets you make any modifications you want to a screen before taking a screen shot. You can't edit an image as extensively within Capture or Screenshot; you have to save an image to a paint program such as Photoshop or MacPaint to do the kind of editing you can within Exposure.

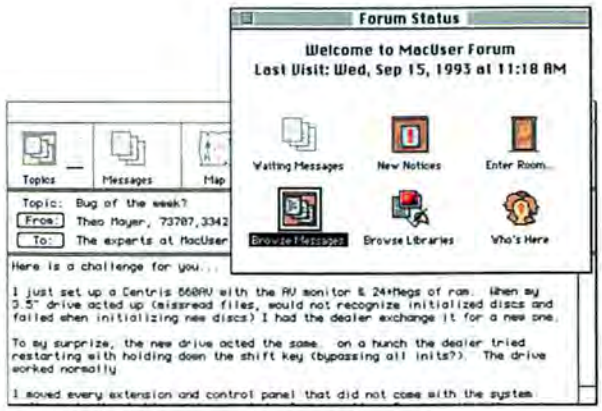

Figure 1: As is typical of on-line services, the MacUser Forum on ZiffNet/Mac lets you have conversations with other computer users, specifically *MacUser* editors and readers. You can also download programs to your Mac from libraries full of freeware and shareware.

each additional hour costs $3.50. CompuServe's pricing plan is more complicated, with an $8.95 monthly membership fee plus hourly charges of $6 and up for certain forums and services, including many of the computer forums. ZiffNet/Mac, which is accessible through CompuServe, costs a flat $2.50 a month on top of the $8.95 CompuServe membership fee.

I don't know what I'd do without CompuServe and America Online. Try 'em, you'll like 'em. And when you do, drop me a line — I'm 76004,2076 on CompuServe and LeVitus on America Online.

I swear that I didn't pay Mathieu to give us this opportunity to plug the book Andy and I recently wrote on just this subject. If you want more information, pick up *Dr. Macintosh's Guide to the On-Line Universe* (Reading, Massachusetts: Addison-Wesley, 1992).

Andy: Hold your horses, Bob, hold your horses. The real purpose of an on-line service is to connect people with people. Yes, you can download software; yes, you can get news and information; but by far the most powerful aspect of an on-line service is that it allows someone to ask, "Hey, anyone want to talk about such-and-such?" and receive dozens of responses.

On-line services can be broken down into three groups:

1. Privately run bulletin boards range from a single Mac SE in someone's laundry room to superboards running on a roomful of personal computers. There's usually an annual fee for their use.

2. Commercial services, such as America Online and CompuServe, are national in scope and allow you to contact the widest range of people but can cost beaucoup bucks.

3. And then there's the Internet — the best reason yet to have a modem. Rather than a central computer, it's an international network of government, university, and private computers that exchange messages and files. It has hundreds of diverse news groups (similar to forums or message areas) such as the one dedicated solely to *Mystery Science Theater 3000.*

If I continue my rant about the Internet, there'll be no room for ads. For more information, take a look at Ed Krol's *The Whole Internet User's Guide and Catalog* (Sepastopol, California: O'Reilly and Associates, 1992), available at finer bookstores everywhere.

Bob: Delphi (800-695-4005 or 617-491-3393), an on-line service available in most cities, gives you full Internet access. And it's reasonably priced — one plan costs $10 for 4 hours of on-line time per month plus $4 for each additional hour; the other plan costs $20 for 20 hours per month plus $1.80 for each additional hour.

Michael Fraase's *Mac Internet Tour Guide* (Chapel Hill, North Carolina: Ventana Press, 1993) is my book of choice for information about the Internet. It is aimed exclusively at Mac users, includes nifty software on-disk, and is clearly written.

Quicker-Ticking IIsi

Q. BMUG published a letter on replacing the 40-megahertz oscillator in the IIsi with a 50-megahertz one. Why does this component speed up the IIsi? If I install an accelerator later, could the new oscillator cause problems?

Marek Hajek
Ducksburg, IN

Andy: I'm always happy to hear from our readers in Ducksburg, which is the city I put in when I've lost the letter containing the reader's actual city of residence. Sorry, Marek.

An oscillator is a vibrating crystal that serves the same purpose as the burly guy who beats the drum in the bow of one of those big galley ships you see in old movies. Most operations are synchronized to the speed of the crystal, so getting one with a faster drumbeat speeds things up.

The bottom line is that replacing it is a risky venture. Much like designing a nuclear power plant, designing a computer depends on the specifications of all of its individual components. Although you can sometimes get away with going "out of spec" here and there for the sake of added performance, you tend to knock the rest of the system out of whack in wholly unpredictable ways.

I've done the modification myself, and it seems to work fine. But the effect such a modification will have on an accelerator is unknown. You won't know for sure until you actually plug one in.

Bob: Two further words of wisdom: Be sure you save the old oscillator in case anything goes wrong, and don't forget that modifications such as this void your warranty.

System-Folder Fodder

Q. I was roaming through my hard disk and found three System files and three Finders. Do I need all the Finders and Systems, or can I trash them?

Ted Lansdale
Garden City, NJ

Bob: Get rid of all but the System file and Finder in your active System Folder. You can identify the active System Folder as the one with a small computer as part of its icon. The *inactive* System Folder is plain (see Figure 2).

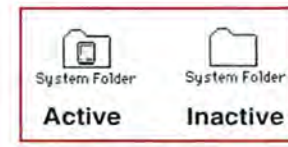

Figure 2: More than one System Folder on your desktop can wreak havoc. Keep only the active folder, the one with a little computer as part of its icon.

An even safer technique is to boot from a startup floppy disk, such as the Disk Tools disk that comes with most Macs, and delete all of your System Folders except the one with your fonts and third-party control panels in it. Then delete the System file and Finder from the remaining System Folder. Reinstall your system software from the master

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CIRCLE 120 ON READER SERVICE CARD.

disks, using the Apple System Software Installer to ensure that all the pieces your Mac needs, such as control panels and extensions, are installed properly.

Andy: The only practical reason for having more than one System Folder is being able to switch between System 6 and System 7 if you work on an older Mac. If that's the case, grab yourself a copy of SystemSwitcher, a freeware program that lets you choose which System Folder will be active the next time you start up your Mac. (On ZiffNet/Mac, you can find SystemSwitcher under the filename SYSWIT.SIT in the Download & Support Forum.)

Otherwise, Bob's right — multiple System Folders can profoundly befuddle your Mac, although his advice is a bit extreme. You can trash the extra System Folders without reinstalling your system software from scratch.

Depersonalizing Programs

Q. You might think this is silly, but I've got a problem. My brother helped me install Excel 4.0 on my machine. He thought he was being cute and typed *Butthead Fenimore* when the installer asked for a name. Now the splash screen says the copy is "licensed to Butthead Fenimore" every time I launch Excel. I tried reinstalling the program, but the personalization is on the master disk. Is there any way to undo his playfulness, short of ordering a replacement disk from Microsoft?

Randi Fenimore
Las Vegas, NV

Bob: The easiest way I know of is to find a copy of Dave Hirsh's $5 shareware program DFerase (the *DF* stands for *data fork*, which is where the personalization information is stored in many programs, including Word and Excel). If you're handy with a hex editor that can open the data fork of a file, you can probably use it to clear the data fork of the Excel installer, but DFerase is much handier.

Andy: Stashing registration information away in a program's data fork used to be a pretty common practice, but nowadays, it's fairly rare. If DFerase doesn't work, the only other method available is to use a nice studly disk editor to search the raw data on the disk for *Butthead* and then insert something more appropriate, character by character. You'll be limited to a string the same length as the original registration info, but it's a solution.

It's for reasons such as this that I always install new software from backup disks and not from the masters; this way, the original disks always remain in pristine condition. Be sure to jot down the registration number on at least one of the master disks. Final tip: Stash the box in a safe room far away from your Mac, where you won't be tempted to dip into it except in actual emergencies. Mine is in a cool, dry basement closet right next to the comic books.

Hard-Drivin' Metal

Q. I'm considering purchasing a 200-megabyte or higher-capacity hard drive. I've noticed that one drive can have a faster access time but slower transfer rate than another and vice versa. Which factor (access time or transfer rate) is more important?

Jose Garcia
via ZiffNet/Mac

Andy: Access time and transfer rate are indeed the two factors that are most heavily touted in hard-drive ads, but these considerations may be irrelevant. Of the two, access time is usually — note that I say *usually* — less important. It's simply a statement of how fast the drive can get its read/write heads to where they need to be. Technically, it's a combination of two factors: seek time (how fast the heads can move to the right track) and latency (the average amount of time it takes for the drive to spin the desired bit of data on a platter into position under the heads). Transfer rate, on the other hand, refers to the time it takes to shovel that data into your Mac, so it's a bit more impressive. For those applications in which Everest-esque mounds of data are being shuttled to and fro (when you're working with QuickTime or editing photo-realistic graphics files, say), a fast transfer rate is key.

But in the getting-back-to-reality department, when you're talking about the workload of the average Mac — a little word processing, some spreadsheeting, getting addresses from a contacts database — you probably won't reap serious benefits by selecting a drive that's six points faster than another (also keep in mind that heavy competition in the industry means that a vendor is well motivated to shave off a few milliseconds for an ad by factoring in the use of special disk-caching software). This is another awesome opportunity for me to gently mention the Duhhh Factor, the principle that your computer spends more time waiting for you than you spend waiting for it.

Once you've determined that a particular drive's speed is in the ballpark of competing drives', I don't think you should waste much more time worrying about speed. Turn to more-important matters: How long will the warranty cover you? Has the vendor been around long? Does the drive come in an enclosure with lots of hardware comforts or in an all-plastic jobbie more suitable for housing your G.I. Joe action figures?

Bob: Here's a basic hint: Try to order from a vendor that offers an unconditional money-back guarantee for 30 days or so. That way, if the drive you order doesn't *feel* fast enough to you (and after all, your perception of its speed is all that matters), you can trade up to a faster one with no questions asked.

Andy: Which once again goes to prove that *where* you buy something is just as important as *what* you buy.

Flaunt Your Font

Q. Is it possible to use some of our expensive Mac fonts on the PCs in my mixed Mac/Windows office?

Dave Thibaldeaux
via ZiffNet/Mac

Andy: If you want to share TrueType fonts, no problem. TrueType is an aggressively multiplatform font standard — moving fonts from one kind of machine to another is nigh trivial. The only thing you need is a shareware utility such as Chris Reed's TTConverter (ZiffNet/Mac filename TTCONV.CPT), which can put almost any TrueType font into an acceptable form for Windows 3.1. From there, all you have to do is move the file onto a DOS disk or onto a DOS volume via a network or a modem.

To share PostScript fonts, you have two solutions. First, you can buy a commercial font utility such as FontMonger, from Ares Software (415-578-9090), which automates the process necessary to make a Type 1 font suitable for the PC. FontMonger also lets you translate between PostScript and TrueType formats and to edit fonts.

Second, if you have a SCSI-port-outfitted PostScript printer shared by both kinds of machines, you can permanently download fonts from the Macintosh to the printer's hard disk. Then install the (usually) free bit-mapped versions of the fonts on all the machines.

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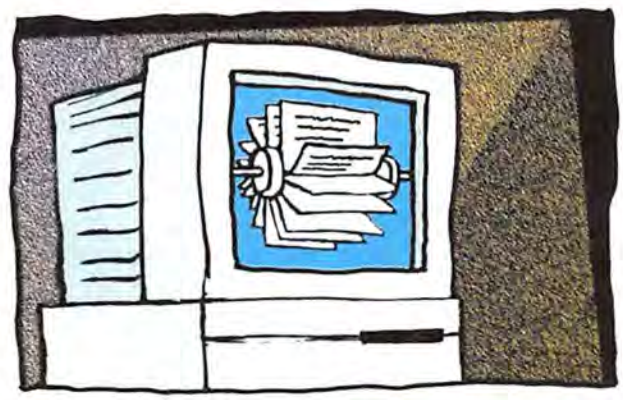
ZiffNet/Mac

Get Organized

PIMs (personal information managers) are a hot software category — it's now hip to keep track of birthdays, appointments, and phone numbers by using your Mac. With the New Year rolling around, we suggest you resolve to get organized by putting an electronic calendar, notepad, or address book to work for you.

PIMs have been available on-line from services such as ZiffNet/Mac for years, and although shareware PIM products aren't in the same league as some of their commercial kin, an inexpensive utility may suit your needs perfectly. And because you can try it before you pay the shareware fee, taking a PIM for a quick spin can help you decide whether you could benefit from organizational software in general.



Places to Go and Things to Do

Among the more popular shareware PIMs available on ZiffNet/Mac are **Address Book** (ADDRBK.SEA, Library 1) and **PhoneBook Plus** (PHONPL.SEA, Library 1), two full-featured address-book applications, each capable of dialing numbers and printing envelopes. Address Book has a slight edge in features, but PhoneBook Plus uses a less cluttered interface.

For those who want their Mac to help them with time management, a range of calendar and reminder applications are available. John Covele's **Right On Time** (RIGHTO.SIT, Library 1), which combines a calendar and an event list, is probably the most elegant shareware to-do-list program available right now. And **GMS Calendar** (GMSCAL.SEA, Library 1) provides a straightforward calendar, with space supplied for you to make annotations. **Notify** (NOTIFY.CPT, Library 3) is a control panel that lets you jot down upcoming events, which it will remind you of at regular intervals.

On the Head of a PIM

One of the best all-around shareware PIMs is **DeskTools** (DTOOLS.SEA, Library 1), a handy information-storage utility that not only holds address and phone listings but also enables you to create and manage miniature databases called glossaries, which can store any frequently used information, from Mac specs to bibliographies. DeskTools also provides reminders, a full-featured calendar, and a to-do list.

If you must have the ultimate in electronic organizers, you have probably already spent your hard-earned money on a PDA (personal digital assistant), such as Apple's Newton MessagePad. Those of us who can't afford a pricey PDA can console ourselves with **Poor Man's Newton** (PMNEWT.SIT, Library 6), a HyperCard-based mock-up of 1993's most popular fashion accessory. Author Joseph Cicinelli has endowed this PDA for the masses with a basic set of address and phone-list features.

Help for the Hapless

Several *MacUser* utilities available through ZiffNet/Mac can help you organize the contents of your hard disk. Even if your Macintosh is an electronic swamp, you can quickly locate your vital documents and applications with **FindPro III** (FINDPR.SIT, Library 9), weed out all those orphaned aliases with **Alias Assassin** (ALIASA.SIT, Library 9) or **Auto Assassin** (AUTOAS.CPT, Library 9), and purge the junk that collects in the dark corners of your hard disk with **Clean Sweep** (CLNSWP.SIT, Library 9).

Good luck living up to your New Year's resolutions; as for myself, now that I have finally gotten my overflowing hard disk in order, I think this year I'll try backing up more often.

FREE! FINDER TOOLS

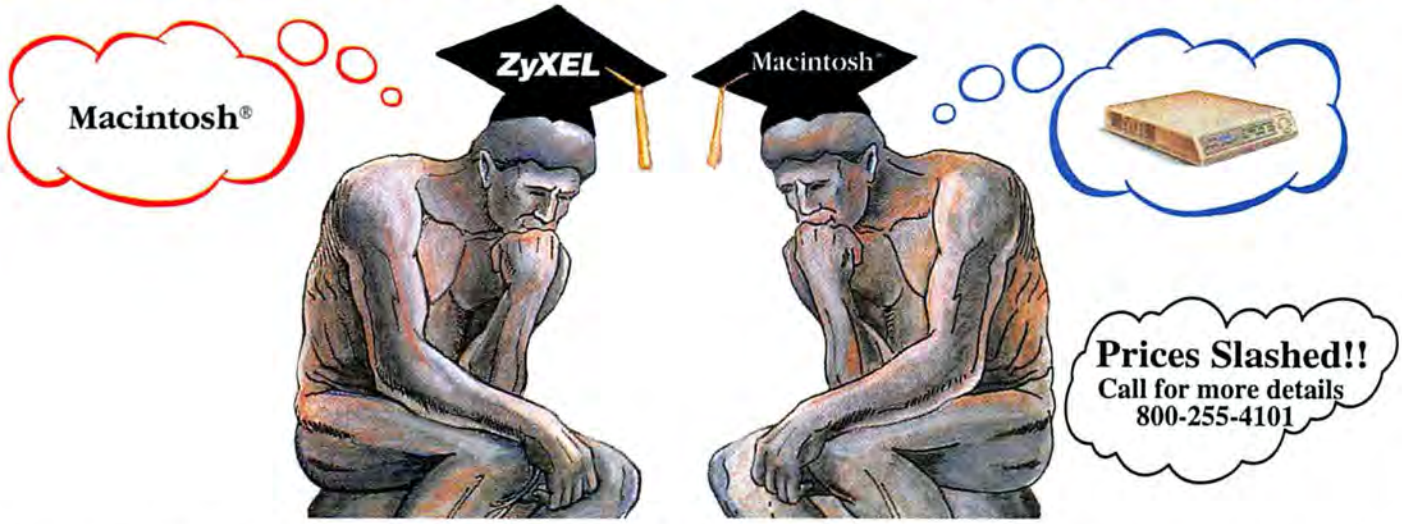
This month's *MacUser* utility, FinderPal, gives the Finder a set of tools that let you switch applications; move, copy, and modify files; launch scripts and programs; and perform standard Finder functions with a click of the mouse. The tool palettes "float" above the current application window, giving you access to FinderPal's tools.

One tool palette contains the file-manipulation tools, your own scripts and macros, and aliases to applications and folders. You simply select a file in the Finder and click on a palette button. You can then open the file with an application, move it to a specified folder, delete it, copy it, even change its type and creator. The second tool palette shows you the applications you have currently running and lets you switch from one application to another.

FinderPal was created by Robert Mah, author of *MacUser* utilities including WindowRanger and ThumbNail. You can contact Robert on ZiffNet/Mac at 72511,421. FinderPal is available exclusively on ZiffNet/Mac and from AppleLink's ZiffNet Selections. ZiffNet/Mac members can download FinderPal free of connect-time charges until December 25, 1993, by typing GO ZMC:MACUTIL. After that, you can find the file FINPAL.SIT in Library 3 of the MacUser Forum (GO ZMC:MACUSER). AppleLink users, look for FinderPal in ZiffNet Selections:MacUser Software:Utilities.

By Mark Simmons

GREAT MINDS THINK ALIKE



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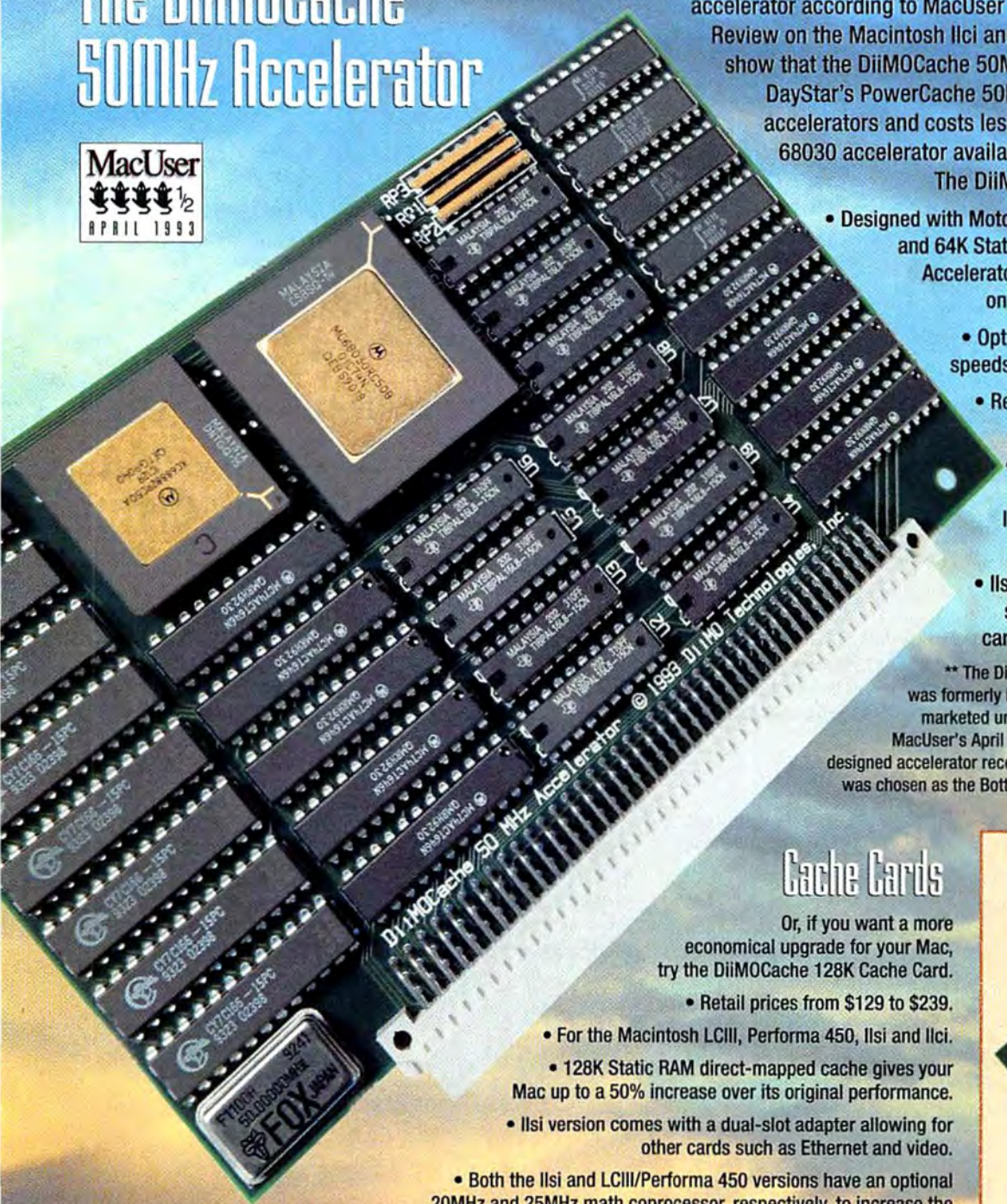

The DiiMOCache 50MHz Accelerator is the fastest 68030 accelerator according to MacUser Lab's April 1993 Accelerator Review on the Macintosh IIci and IIsi.** MacUser's tests also show that the DiiMOCache 50MHz Accelerator outperforms DayStar's PowerCache 50MHz and most 68040 25MHz accelerators and costs less too! If you want the fastest 68030 accelerator available, there is only one choice. The DiiMOCache 50MHz Accelerator.

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** The DiiMOCache 50MHz Accelerator design was formerly licensed to Logica Research, Inc. and marketed under the LogiCache™ brand name. In MacUser's April 1993 Accelerator Review, the DiiMO-designed accelerator received a 4 1/2 Mice rating out of 5 and was chosen as the Bottom Line Pick for the Mac IIsi and IIci.

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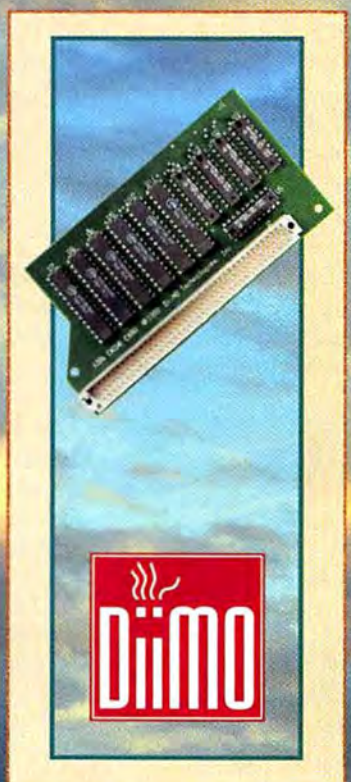

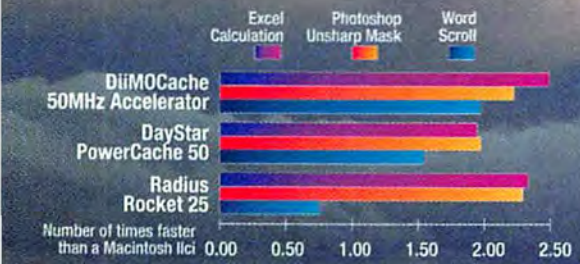

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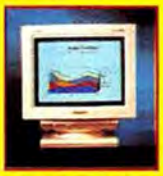

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- UMAX UC840 24-Bit Scanner
- Adobe PhotoShop 2.5
- Apple Adjustable Keyboard
- ABC Software Bundle & Cables

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- Mac Quadra 660av 8MB RAM, 230MB HD, CD ROM (Voice Recognition & Generation, Video In & Out, 16-Bit Sound, DSP)
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- Infinity 88/RW44 Syquest Drive
- UMAX 600DPI Color Scanner
- Extended 101 Keyboard
- ABC Software Bundle & cables

Quadra 650 PowerSystem $3965/$128 p/m*

- Mac Quadra 650 (33MHz!) 8/230 w/CD ROM Drive
- Sigma ErgoView 17 Monitor & 16-Bit VRAM
- Extended 101 Keyboard
- ABC Software Bundle & Cables

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- NEW! Quadra 605 4/80 (25MHz)
- Sigma 14" Trinitron Color Monitor
- Prometheus Ultima Home Office 14.4 BPS Fax/Data & Voice Modem
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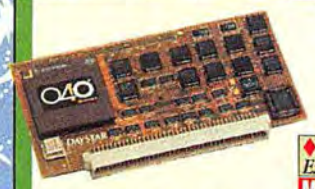

Excellent MacWEEK MAY 17, 1993

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Models available for Centris & Quadras!

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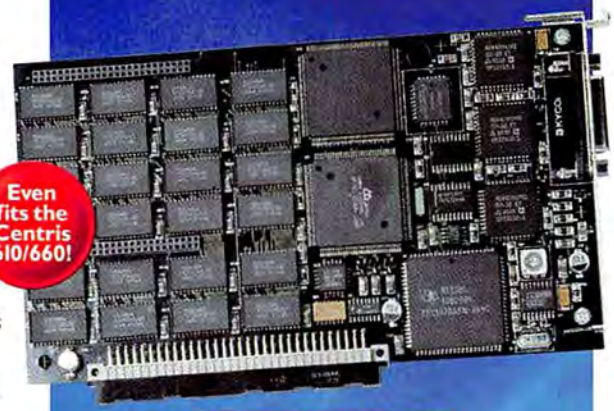

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The new ProView 21-inch Color

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*Requires a multi-sync monitor.
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Microsoft Office is a great deal – the full versions of the latest Microsoft Word, Excel, PowerPoint, and Mail for over $1,000 less than if you had purchased them separately. And they were all designed to work great together.

Microsoft Works is an integrated software package with a word processor, database, spreadsheet, charting, drawing, and communications – all bundled into one. The TrueType font bundle includes over 100 TrueType fonts. ($99.95 value)

Hurry! Rebate offers end 1/31/94.

Minimum requirements: MS Office – Mac Plus, 2MB RAM, System 6.0.5, a hard disk. MS Works – MacPlus, 1MB RAM, System 6.0.5, a hard disk.

Microsoft

5645 Microsoft Office 3.0 (pictured)
5688 Microsoft Office 3.0 CD-ROM ..... $338.*
7192 Microsoft Works 3.0 TrueType Bundle (pictured)
5068 Microsoft Works 3.0 ..... $99.*

* After $100 rebate on Microsoft Office and $50 rebate on Microsoft Works. Microsoft Works/TrueType Bundle offer good while supplies last.

$36.

The Illustrated Personal Organizer

This address book, daily planner, screen saver, and personal daily journal gives you information, entertainment, and wisdom. Discover the history of each day from the perspectives of different subjects, beliefs, and customs. Enjoy the incredible "Living Worlds" artwork created by Mark Ferrari.

Minimum requirements: 2MB available RAM, System 6.0.5, color monitor with at least 640x480 resolution, 7MB available hard drive space, 1.44MB floppy drive.

Seize The Day

6764 Seize The Day: The Illustrated Personal Organizer for Mac
6771 Seize The Day: The Illustrated Personal Organizer for Windows ..$36.

$98.

FREE PIZZA HUT PIZZA!

SuperPaint 3.5

Aldus SuperPaint 3.5 combines the best of paint and draw packages into one program. It's won 15 major awards in the last six years because it provides more "graphics horsepower" for the money. And for a limited time, get a $10 free pizza coupon for Pizza Hut inside your SuperPaint box. Take a break from the holiday bustle and get some free pizza on Aldus.

Minimum requirements: Mac SE, 2MB RAM, System 6.0.5, a hard drive.

Aldus Consumer Division

6493 SuperPaint 3.5

$399.

TVator Pro & Action! Bundle

Turn any Mac or PC into a powerful multimedia presentation system. The TVator Pro is a small, lightweight, portable device that converts analog RGB/VGA to NTSC signals for flicker-free color output on big screen TV, RGB video, LCD projectors, and RGB/SVGA monitors. It includes cables, power adapter, utility disk, TV brightness controller, and user's manual. Macromedia's Action! Bundle is all you need to create professional-quality, high-impact business presentations. It includes Action! multimedia presentation software, SoundEdit Pro, and Perfect Presentations ClipMedia 3. Action! is a revolutionary application that lets you create dazzling multimedia presentations with sound, motion, text, graphics, animation, video, and interactivity.

Minimum requirements: TVator Pro – LC II; LC III; IIvx; IIvi; Centris 610, 650; Quadra 700, 800, 900, 950; PowerBook 160, 165c, 180, 180c; TV with Composite Video or S-Video input. Action! Bundle – Mac IIci, 4MB RAM, System 7, color monitor, CD-ROM drive.

Antec

7150 TVator Pro & Action! Bundle

$198.

Arrange & Connectix Desktop Utilities Bundle

Now, in one bundle, get the ultimate Personal Information Manger (PIM) and a set of essential utilities for your Mac. **Arrange** is a fully integrated PIM that lets you organize contacts, schedules, to-do lists, projects, files, notes and much more. It's completely customizable for totally personal solutions. A powerful "drag-and-drop" interface, intelligent importing, and automatic merging and sorting make it quick and easy to use. And **Connectix Desktop Utilities** has a slew of handy functions. Set your Mac to automatically shut down, saving power. Add function and cursor keys without an extended keyboard. Preserve the life of your monitor with a screen saving dimmer, and much, much more.

Minimum requirements: Mac II, 1.5MB available RAM, System 6.0.7, 3MB hard disk space.

Common Knowledge

7216 Arrange & Connectix Desktop Utilities Bundle

$224.

SupraFAXModem V.32bis MacPac

"The SupraFAXModem V.32bis is an excellent value," raves Tom Negrino of *Macworld*. It features 14,400 bps data and fax communications with up to 57,600 bps throughput using V.42bis data compression. The modem automatically negotiates the fastest connection, and sending a fax is as easy as printing. You can even delay transmission until times when long-distance rates are lower. The Silent Answer feature detects if an incoming call is fax or voice, and handles it appropriately. The MacPac includes cables, FaxMania, and WorldLink, FREE. FaxMania is a collection of fun cover sheets, and WorldLink lets you connect to the Internet.

Supra Corporation

4017 SupraFAXModem V.32bis MacPac
6651 SupraFAXModem 144 LC ..... $168.
5575 SupraFAXModem 144 PB ..... $298.

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New!

$41.

ReadySetGrow!

Waaaa! Why didn't someone come up with this sooner? It's a fun, interactive guide for expecting parents that covers all facets of pregnancy and early childhood. Animation, illustrations, sound effects, and text combine to create a thorough reference. ReadySetGrow! also includes sections for a family profile, medical records, calendar, and address book to record the history of your child's beginnings.

Minimum requirements: Any Mac with 1MB RAM (2MB RAM recommended), System 6.0.5, a hard drive.

Atlantis

6991 ReadySetGrow!
6992 ReadySetGrow! Windows ..$41.

HYPERCARD NOT REQUIRED.

$34.

Mangia!

Draft your Mac into KP duty. Mangia! includes hundreds of recipes and you can add your own. Find recipes you can cook with the ingredients on hand. Zero in on recipes for their kid appeal, spiciness, and more. Choose a recipe, then easily adjust the ingredients for the number of servings you need. Plan a menu for a week, and Mangia! writes the shopping list for you.

Minimum requirements: Any Mac with 1MB RAM, System 6.0.5.

Upstill Software

6901 Mangia!

New!

$49.

SkyGazer

This is the ideal companion for anyone first exploring the wonders of the night sky. SkyGazer shows the heavens on your computer screen – complete with planets, galaxies, and even shooting stars. Learn the names of the bright stars. Travel to each of the planets. Colorful animation illustrates common astronomical concepts. Designed for ages 9 and up.

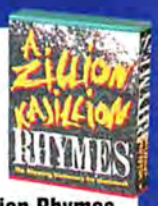
Minimum requirements: Mac Plus, 1MB RAM, System 6.0.5, 3MB hard drive space.

Carina Software

7169 SkyGazer

New!

$32.



A Zillion Kajillion Rhymes

"Turns your Mac into a killer rhyming dictionary... I recommend it unreservedly...," says James Bradbury of *MacUser*. A Zillion Kajillion Rhymes is great fun for the poet in all of us. Not a poet? You will be. Use it for birthday cards, flyers, songs, anything that needs a little fun. Just type a word and click. Kids will love using it to make up their own rhyming stories.

Minimum requirements: Mac Plus, 200K RAM, System 6.0.5. (System 7 savvy)

Eccentric Software

6438 A Zillion Kajillion Rhymes
6915 A Zillion Kajillion Rhymes Windows ..... $32.

$39.

Sailing Master

Don your sailing cap and deck shoes as you race against your Mac and learn how to sail without getting wet. Sail against as many as three boats, and learn about wind shifts. Course options, skill levels, hazards, and other features offer a challenge for land lubbers and old salts alike. "Sailing Master is a lot of fun – well worth the price," says *Macworld*. (Nov. '93)

Minimum requirements: Mac 512K.

Starboard Software

5318 Sailing Master

New!

$31.

Crystal Caliburn

Any Pinball Wizard will "flip" for Crystal Caliburn! Your quest for knighthood is full of surprises and great scoring opportunities. Accolade all twelve knights and then go for the Holy Grail. And Crystal Caliburn includes advanced pinball action like nudge, tilt, battle sounds, 3D ramps, three multiball, flashing bumpers, and more.

Minimum requirements: Any color Mac w/13" or larger monitor, 4MB RAM, System 6.0.7.

StarPlay Productions Inc.

7080 Crystal Caliburn

New!

$39.

Flight Commander

"Check Six... break left!" Flight Commander brings a new approach to air-combat wargaming on your Mac. You lead a whole squadron of jet aircraft with your commands. Test your tactical skills in missions ranging from combat air patrol to long-range precision strikes. Or create battles of your own. You must choose the right pilots, aircraft, and weapons to accomplish the mission objectives.

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.5.

Big Time Software

6962 Flight Commander

New!

$36.

Eric's Ultimate Solitaire

Eric's Ultimate Solitaire is a terrific collection of solitaire card games. They include Klondike, Baker's Dozen, Black Hole, Forty Thieves, Montana, Golf, Spider, Eight Off, Towers, Yukon, Calculation, Poker Square, and many others. Spectacular graphics and animation make these games extra fun to play.

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.5

Delta Tao Software, Inc.

7187 Eric's Ultimate Solitaire

New!

$38.

DinoPark Tycoon

This is sure to become a Jurassic Classic with every young entrepreneur. Use math, economics, business, and science skills to build your dinosaur theme park from the ground up. Kids learn the challenges, responsibilities, and fun of running their own business. DinoPark Tycoon also comes with a fact-filled guide to dinosaurs.

Minimum requirements: System 6.0.7 and 1MB RAM for monochrome, 4MB for color.

MECC

7015 DinoPark Tycoon (For ages 8 to adult)

New!

$59.

Mammals – A Multimedia Encyclopedia

More than 200 mammals come to life on this multimedia CD-ROM from National Geographic. Captivating video and sound clips, and over 700 photographs keep the learning fun, while the equivalent of 600 pages of related text and vital statistics make this CD-ROM as informative as it is entertaining.

Minimum requirements: 4MB RAM, System 6.0.8, color or gray-scale monitor, CD-ROM drive.

National Geographic

7000 Mammals – A Multimedia Encyclopedia

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$39.

New!

Pathways into Darkness & Official Hint Book Bundle

Think fast! You'll have to if you're going to keep up with continuous-motion, 3D, texture-mapped graphics and defeat an alien demon. Separated from your secret special forces team, you embark on your mission to save the world, alone. You'll need your wits, not just firepower, to get by many of the obstacles. Explore miles of catacombs through a smooth-scrolling, first-person interface. Beautifully rendered graphics and active panning stereo sound combine to make Pathways Into Darkness the closest thing to virtual reality without a helmet. The 60-page hint book is your guide to all of Pathways' levels, monsters, items, strategies, and tips. No stone is left unturned! You get all the maps and a level-by-level walk through.

Minimum requirements: Any 256 or 8-bit color Mac, 2MB RAM, System 6.0.5, 5MB hard disk space.

Bungie Software

7186 Pathways into Darkness & Official Hint Book Bundle

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$34.

Greg LeMond's Bicycle Adventure

Journey around the world with Greg LeMond in this interactive reference devoted entirely to cycling history, racing, touring, and more. Every trip is a different experience. Experience the role of bicycling in other societies; travel through time to see Leonardo de Vinci's sketches of the first bicycle; or watch Greg LeMond race! There are hundreds of interactive screens covering diverse topics such as mountain biking, environmental impact, people, and equipment. Read both fact and fiction while losing yourself in the vibrant images, exciting video, and sensational sound of Greg LeMond's Bicycle Adventure.

Minimum requirements: LC II, 5MB RAM, System 7.0, 13" color monitor.

Eden Interactive

6921 Greg LeMond's Bicycle Adventure (pictured)
6922 Greg LeMond's Bicycle Adventure CD-ROM ..... $48.
6923 Golf Who What When Where ..... $48.

MAC'S PLACE EXCLUSIVE BUNDLE

$78.

PowerBook Thunder Bundle

You won't find a better bundle for your PowerBook, or a better value. And this bundle is only available by mail through Mac's Place. **Thunder 7 1.5** is an interactive spell-checker, dictionary, and thesaurus Desk Accessory. It works in most applications like word processors and databases. **DayMaker Organizer 3.0** gets you organized handling calendars, to-do lists, contacts, and phone-call management. With **Magnet** you get all the functions of a backup program, find file utility, file manager, and file synchronizer in one program. **Connectix PowerBook Utilities** (CPU) is the award-winning solution for maximizing PowerBook battery life and increasing productivity.

Minimum requirements: Thunder 7 – Mac Plus, 1MB RAM, System 6.0.3. DayMaker – Mac Plus, 2.5MB RAM, System 6.0.5, hard drive. Magnet – System 7. CPU – PB 100, 2MB RAM, System 7.

Baseline Publishing

7217 PowerBook Thunder Bundle

From $16.

New!

Gametek Games

The ground forces are relying on you for protection, so swallow hard and pilot **Valkyrie** into battle. This 3D helicopter flight simulator gives you 10 tense missions to test your courage and skill. Select any of seven camera angles for the most strategic view. Then home in for the kill using your joystick or a mouse. Get ready for 25 levels of fast arcade action in **MacAttack**. This 3D shoot 'em up provides hours and hours of fun. Use your laser, smart bombs, or other special weapons to finish off your targets and complete each increasingly-difficult level.

Minimum requirements: Valkyrie – 4MB RAM, System 6, 256 colors. MacAttack – 2MB RAM, System 6, 256 colors.

Gametek

7208 Valkyrie ..... $27.
7209 MacAttack ..... $16.
5942 Bill Elliot NASCAR Challenge ..... $28.
6513 Jeopardy ..... $24.
6508 Wheel of Fortune ..... $24.
6033 Journeyman Project ..... $55.

$489.

Painter 2.0 & ArtZ Tablet Bundle

Fractal Design's **Painter 2.0** is the most innovative and exciting paint and photo-design program on the market. And Wacom has long been recognized as the premiere tablet maker. The **ArtZ 6x8 ADB Tablet** is the latest in a distinguished line. Painter 2.0 is a remarkable 24-bit color paint program that simulates the tools and textures of natural media. New tools include a spatter airbrush, Cubist effect, and multiple light sources. It's also a photo-design program with photo compositing and color separation. The ArtZ tablet is an amazing graphical input device. On it you use the stylus as if it were a pen or brush on your screen. The stylus is cordless, batteryless, and detects 120 levels of pressure.

Minimum requirements: ArtZ ADB Tablet - Mac SE, System 6.0. Painter 2.0 - Mac SE/30, 2.5 MB RAM, System 6.0.5.

Wacom Technology/Fractal Design Corp.

5355/5657 Painter 2.0 & ArtZ ADB Tablet Bundle

$178.

FontChameleon

FontChameleon gives you a type library of over 200 of the most popular text fonts and the ability to create literally millions of new fonts just by moving slider bars. You can create fonts in Postscript Type 1 (for ATM support) or TrueType formats for the Mac or Microsoft Windows. Each font you create is fully hinted, so the font will have the hand-crafted quality of an original design. FontChameleon's revolutionary technology allows you to alter the preset designs by "blending." For example, you can blend Franklin Gothic and Bookman to create a new design. Each font's X-height, condense/extend, and boldness can be automatically altered with easy-to-use slider controls.

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.7., a hard disk.

Ares

6766 FontChameleon (pictured)
6765 FontHopper ..... $41.
5673 FontMonger ..... $96.

$324.

New!

Elastic Reality

Hollywood professionals call Elastic Reality the most powerful and complete Macintosh morphing product available. And it's a completely shape-based morphing and warping system. There are no cumbersome meshes, points, or vectors to get in your way. Instead, you create morphing effects the same way you think about them – by manipulating shapes and colors. Features include regional motion and fade control, re-usable shapes, wireframe preview for motion testing, resolution independence, and full-motion warp support with automatic "tweening." Now you can own this professional-effects package at a special introductory price. It includes a tutorial video. *MacUser* gives Elastic Reality a 4-mice rating.

Minimum requirements: FPU-equipped Mac & color QuickDraw, 8MB RAM, 8-bit monitor, System 7.0.1, QuickTime 1.5, hard drive.

ASDG

7084 Elastic Reality

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PowerBook Duo Battery

Absolute Batteries offer you the most affordable PowerBook power. They have internal protection against short circuiting and gold terminals for optimal contact. These are the finest quality cells available and have a full one-year protection warranty. Each has a two-hour average life before recharging is necessary.

Absolute
6684 PB Duo Battery

$138.

New!

SCSI MicroDock

Expand the capabilities of your PowerBook Duo with this light weight, low-cost, extremely small docking bar. It lets you easily connect your Duo to ADB devices like a mouse and SCSI devices like a SyQuest or CD-ROM drive. And you can use the same SCSI cable to connect your Duo to another Mac, and have it appear as another hard drive on the other Mac's desktop.

Newer Technology
6904 SCSI MicroDock

$558.

NEW LOW PRICE!

Bernoulli MacTransportable Multidisk 150

Enjoy all the benefits of a Bernoulli with the flexibility to read and write to disks of many capacities – 35MB, 65MB, 105MB, and 150MB. And the Multidisk 150 is downward compatible so it reads and writes to 90MB disks and reads 44MB disks. You get unlimited storage expandability, lock-away security, and transportability. The patented Bernoulli design resists head crashes and the sturdy disks can survive a drop of eight feet! This Bernoulli is internally terminated with a single external SCSI connector, so it must be installed as the last device on your SCSI chain.

IOMEGA
5609 Bernoulli MacTransportable Multidisk 150

$559.

CV Link w/Action!

Stop crowding around your little computer monitor to watch presentations! Just output your Mac screen to a TV, VCR, or video projector with the **CV Link** from Display Tech Inc. It sends your Mac's video output to NTSC composite, S-Video, or RGB capable devices – from a 2-inch portable TV to video projectors that you can see a hundred feet away! The CV Link will output anything you can put on the Mac's screen, and will not slow down graphics. And get Macromedia's Action! and create exciting multimedia presentations using QuickTime clips, titling, and animations which can then be "printed" to videotape through the CV Link. A potent package at a nice price!

Minimum requirements: CV Link Scan Converter – Mac LC, LCII, LCIII, Performas, IIvx, Centris's, Quadra's, PowerBooks with video out.

Display Tech, Inc.
6877 CV Link Scan Converter w/Action! ..... $559.
6875 Mac DisplayLink w/Action! ..... $374.

New!

$35.

UnderWare

Get all the fun of a screen saver while you work! Other screen savers only run while your Mac is idle, but UnderWare runs in the background on your desktop. And these modules don't just blank out your screen, they actually interact with the icons and windows on your screen. (Like a fire-breathing dragon melting your trash can!) You get over 30 modules. After Dark modules work too.

Minimum requirements: LC, 4MB RAM, System 7, Color QuickDraw.

Bit Jugglers
6931 UnderWare

$39.

$10. OFF!

Square One

Square One stores all of your favorite files in an easy-to-use icon palette. To access a file, just double click on its icon. Group several files into a single work-group icon and open them all at once. No more time wasted rummaging through your hard drive, and no goofy hierarchical menus. Just point and click with Square One.

Minimum requirements: Mac Plus, 2MB RAM, System 7.

Binary Software
7027 Square One

How to Order

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- Mac's Place is open from 7 a.m. to 11 p.m. M-F Mountain Time, and 7 a.m. to 7 p.m. on Sat., and 8 a.m. to 6 p.m. on Sun.
- No sales tax (except OH residents add 6% to total, including shipping).
- VISA, MasterCard, Discover Card, American Express, OPTIMA, checks, and P.O.s gladly accepted. Your credit card is never charged until your product ships.
- All in-stock items ship same-day, (barring system failure, etc.) to your doorstep, for just $3 (USA) via Airborne Express overnight service. Rural locations may require an additional day for delivery. Areas not serviced by Airborne Express will be sent via Priority Mail.
- Our $3 shipping charge includes insurance at no extra charge.
- When a partial order is shipped, we pay freight on additional shipments.
- Many products carry a money back gurarantee (MBG).
- Defective software is replaced immediately with like items. Defective hardware items repaired or replaced at our discretion.
- We reserve the right to revoke money back guarantee privileges.

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- Call 1-406-758-8000 for our international sales line.
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New!

$89.

QuickFLIX

QuickFLIX is the first inexpensive movie-making tool for Mac users. It makes the production of QuickTime movies more affordable. And it's got the power to build QuickTime movies for business presentations, educational uses, CD-ROMs, or just for fun. QuickFLIX is the personal movie making software for all Mac users. It's got all the software tools you need to produce your own movies including digitizing, editing, basic special effects, sound editing, titling, layering, and motion control. All in a familiar Macintosh interface. Don't doom another vacation's memories to a dusty collection of unedited VHS tapes. Get QuickFLIX.

Minimum requirements: Mac II, 3MB RAM, System 7, a hard disk.

VideoFusion
6784 QuickFLIX
5165 VideoFusion ..... $448.

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300 dpi printing in black w/ optional color. Great companion for the Mac PowerBook

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300 dpi black on plain paper, compatible with most popular Mac software, 13 scalable fonts

HEWLETT PACKARD

Hewlett-Packard DeskWriter 550C Printer **$579**

Affordable laser-quality black & color printing

HP DeskWriter C Color Printer .. $389

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Suntouch Mac Extended Keyboard **$89**

Suntouch MacPad Extended Numeric Pad for PowerBooks **$39**

Storage Devices

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SYEX 88C Removable $459
SyQuest 5110C mechanism; accepts 44MB & 88 MB media; incl. 1 cartridge and 1 formatting utility. Comes with a 2 year warranty

SYEX 105 Removable $539
3.5" SyQuest mechanism; 105MB capacity; includes 1 cartridge and formatting utility. Comes with a 2 year warranty

PLI

Infinity 40 Removable Ext $349
Infinity 88/RW44 Removable Ext $499
Infinity 105 3.5" Removable Ext $569
1 GIG External Mini-Array $2149
2 GIG External Mini-Array $2899
3.5" Magneto Optical Fujitsu $1089

CD-ROM Drives

NEC

CDR-600 ..... $569
CD-ROM reader features a data transfer rate of 450 kb/sec & a 195 ms access time. Kodak Multisession PhotoCD™ & QuickTime compatible. Requires interface kit.

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SyQuest
45MB $65
88MB $95
105MB $59

Accelerators

DAYSTAR DIGITAL

25 MHz 040 i **$689**
33MHz Turbo 040 ..... **$1073**
Universal PowerCaches
33MHz/ w/68882 ..... **$333/$419**
50MHz/ w/68882 ..... **$623/$749**
FastCache Turbo **$165**
Quad 040 ..... **$1579**
FastCache Quadra 700,900,950 (128K) **$373**

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Low-cost large screen color display for business.
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Compatible with Quadra built-in video.
SuperMatch 21" Two-Page Color ... $2379
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20" Trinitron® display with unmatched versatility.

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E-MACHINES

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Ultura™ LX **$1069**
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NEC

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MultiSync® 4FGes™15", 1024 x 768 ... $719
MultiSync 5FGes™17", 1024 x 768 . $1095
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MultiSync 6FGp™21" 1280 x 1024 .. $2399

radius

Radius™ PrecisionColor™ Pivot® Display **$799***
15", dual-orientation, full page color display.
*Price after $100 mail-in rebate

Hurry! offer ends 12/31/93

Radius Two-Page Display/21 ..... $799
21" monochrome display
Radius 20GS Display $799
20" monochrome display, Mac AV compatible.
Radius PrecisionColor Display/20v $1799
Low cost 20", 1152 x 870, "on-the-fly" resolution switching. Great for desktop design work.
Radius IntelliColor™ Display/20 .... $2539
20" Trinitron®, Macintosh AV compatible

Radius Graphics Cards

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PrecisionColor Pro 24X **$1899**
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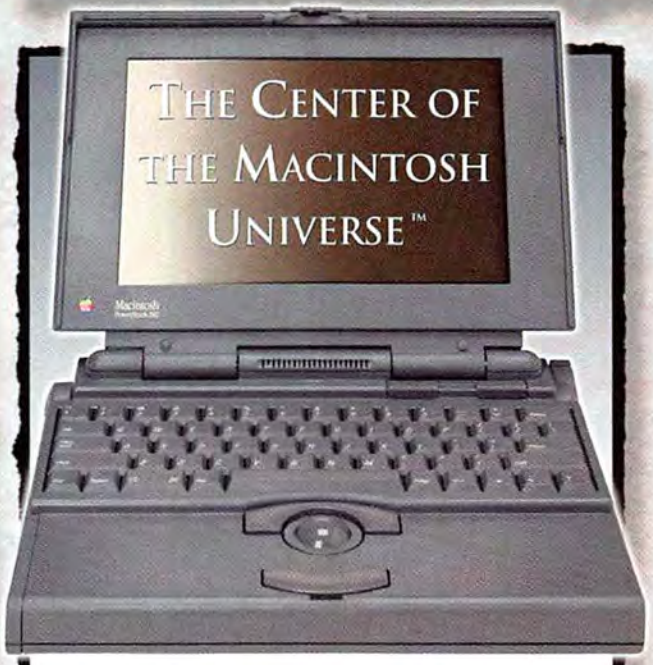

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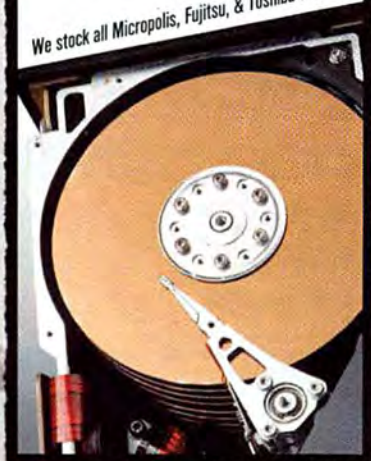

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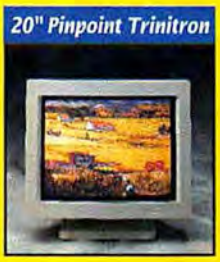

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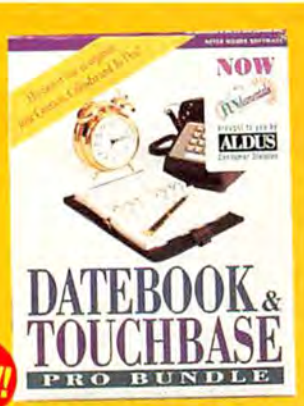

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Publisher: GraphSoft

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COM0186

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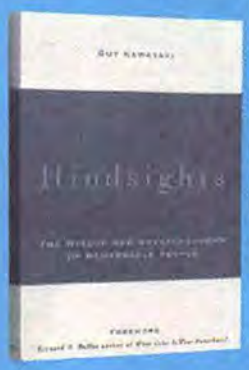

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Publisher: Beyond Words

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Publisher: Chariot Software

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UTI0264

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FUJITSU

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2.4GIG	M2654	5.25" Full Height	11.5ms	2000mb	$1629	$1729

* One YEAR Warranty

Seagate

30 DAY MONEY BACK GUARANTEE

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
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2.4GIG	ST12400N		9ms	2000mb	$1699	$1759
1.9GIG	ST11950N	*Barracuda 1*	8ms	1350mb	$1599	$1659
2.4GIG	ST12550N	*Barracuda 2*	8ms	2050mb	$1949	$2009
5.25" FULL HEIGHT						
1.6GIG	ST41651N	Wren-8	15ms	1350mb	$1165	$1265
2.1GIG	ST42100N	Wren-9	12.9ms	1900mb	$1485	$1585
2.4GIG	ST42400N	Elite-2	11ms	2050mb	$1799	$1899
3.4GIG	ST43400N	Elite-3	11ms	2750mb	$2219	$2319

Seagate drives carry a ONE Year Warranty.

TWO YEAR WARRANTY

Maxtor

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345mb	7345S	3.5" Low Profile	12ms	327mb	$369	$429
540mb	MXT-540	3.5" Low Profile	8.5ms	521mb	$769	$829
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CMO-OMD5010	Epson	128mb	3.5" HH	45ms		$849
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MacUser Magazine ★★★★ January 1993

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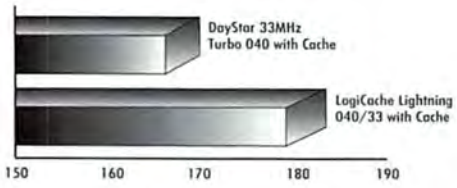

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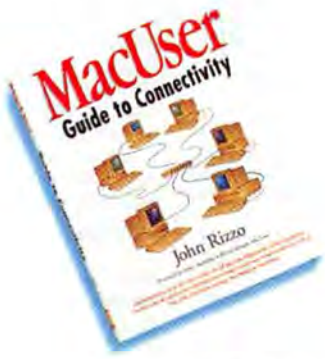

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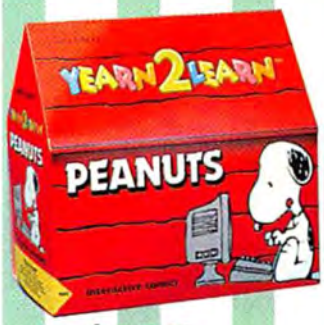

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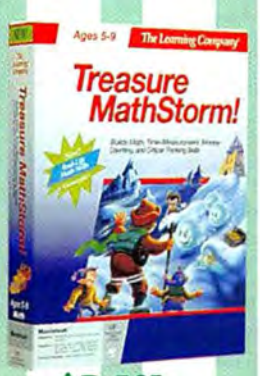

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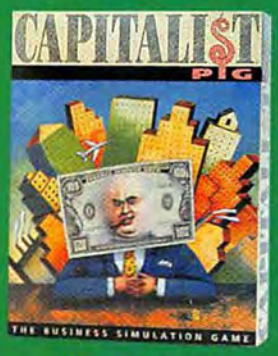

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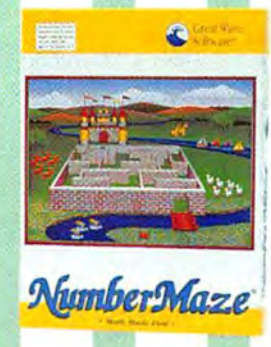

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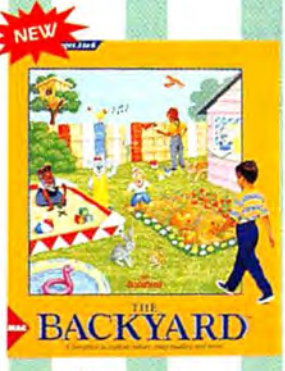

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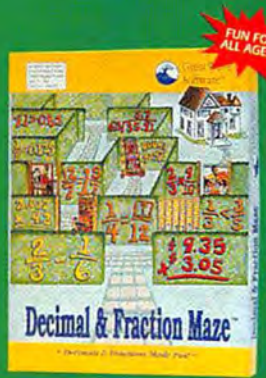

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Diskettes		264	
General		264	
Input Devices	251		
Memory Upgrades		264	
Networking		268	
Peripherals	252	269	
Powerbook Products	252		
Power Supplies			280
Printers	253	271	280
Scanners		271	
Security			
Tape Drives			
Used Equipment			
SOFTWARE			
Accounting			280
Back Up Systems			
Bar Coding		271	
Business	253		280
Business Time Management			
CAD/CAM		272	
CD-ROM	254	272	
Communications/Networking		271	280
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Educational			280
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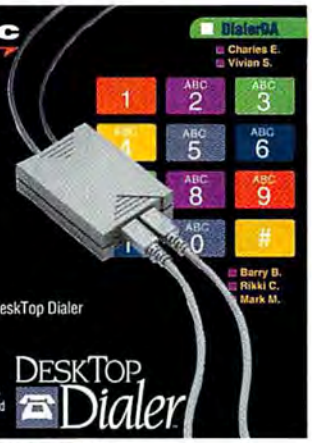

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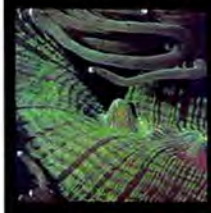

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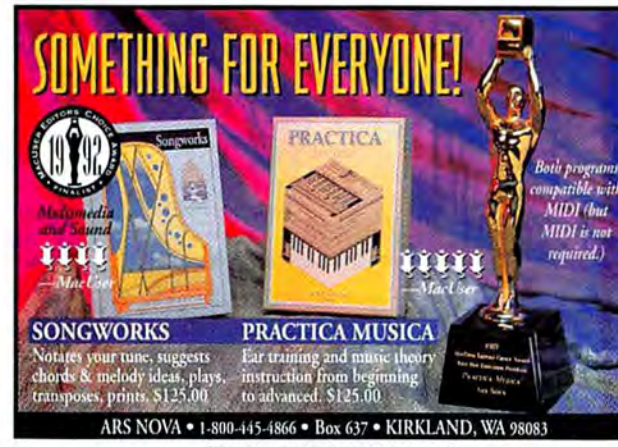

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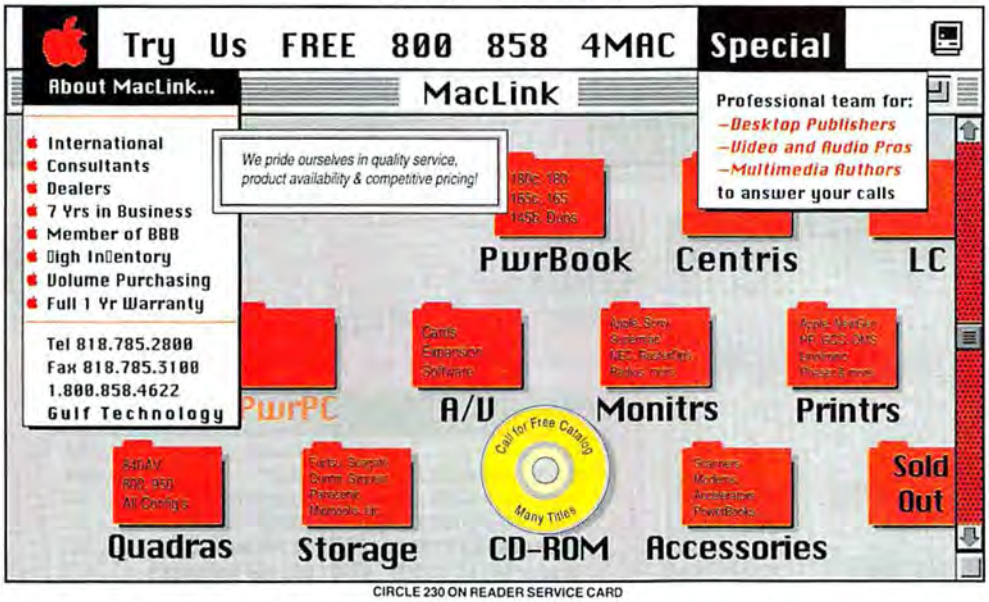

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8x8 - 80NS	Call
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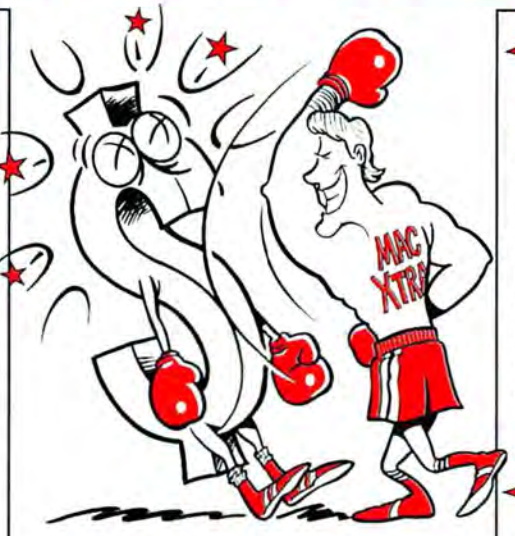

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340MB	12ms	4500	Quantum	2 Years	$359	$419
340MB	13ms	4011	Conner	2 Years	$339	$405
520MB	12ms	4400	Fujitsu	5 Years	$550	$610
525MB	10ms	4500	Quantum	2 Years	$555	$615
540MB	10ms	5400	Conner	2 Years	$585	$645
540MB	8.5ms	6300	Maxtor	3 Years	$699	$759
1050MB	10ms	5400	Micropolis	5 Years	$899	$969
1060MB	9ms	5400	Conner	2 Years	$939	$999
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1080MB	9.5ms	5400	Fujitsu	5 Years	$849	$909
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1370MB	10ms	5400	Conner	2 Years	$979	$1049
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Pioneer	270ms	612KB/sec	6 Disk Changer	N/A	$1219

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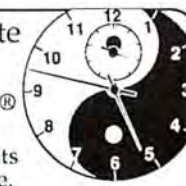

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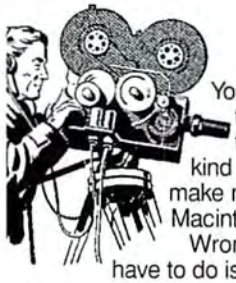

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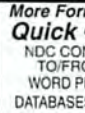

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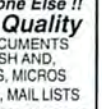

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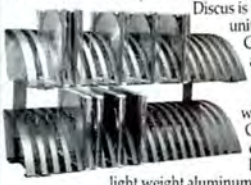

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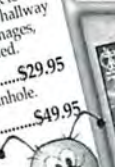

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Apple's Entropy Case

Maybe Apple can't get its message across because nobody there remembers what it is.

I finally upgraded my Mac system to a Quadra 950, a LaserWriter Pro 630, and a fancy color scanner. I connected the Quadra to a 20-inch Radius monitor I've been itching to use. Unlike in the PC world, where such a system change would mean a lost weekend, this whole upgrade took about an hour. Amazing. What's more amazing is that the new system worked with no hitches. A PC system takes about the same amount of time to physically set up (assuming you have the right cables), but you lose a weekend while you try to get it to work, because you have to deal with such things as nonstandard BIOS chips, SCSI that doesn't work, and IRQ conflicts (feel for the hapless newcomer who doesn't have a clue about IRQ conflicts — I won't explain them here).

The difference between the world of the Mac and the world of the PC is more profound than any but a few Mac users realize. Because of this lack of perspective (and as I've said before), the Mac side no longer has the know-how to promote itself. A while ago, Apple came close with some TV commercials featuring dummies reading gibberish from a Windows installation manual, but that was the exception that proved the rule.

I think this problem is caused by Apple's own generational entropy. Apple's two founders — Steve Jobs and Steve Wozniak — are now so long gone from the company that any original vision they may have contributed has vanished. They're not the only ones. Bud Tribble, who ended up at Sun (of all godforsaken companies), Bill Campbell (last seen at GO), Andy Hertzfeld, Bill Atkinson, and other people who had a sense of Apple's mission and purpose are all gone. Those few left at Apple who understand its tradition have been silenced by newcomers and know-nothing "professionals."

A perfect example of generational entropy at work is the layoff of Ric Jones a few years back. This was one of the most boneheaded acts any company could perform, and it signaled the beginning of a new era at Apple.

The Ric Jones Fiasco

PR guru Regis McKenna, who used to do more than he does now (for whatever reason), years ago enjoyed giving presentations showing how Apple's news coverage was completely out of proportion to its size. In the late 1970s and early 1980s, Apple was in the news all the time, because writers who wrote about computers loved writing about Apple. But the journalistic tradition of giving Apple lots of favorable press is lost.

One reason for Apple's good press was Ric Jones. Ric worked with the Apple loaner program, the program that strategically loans equipment to writers, organizations, and influence peddlers. During one of those layoff/reorgs Apple is so fond of, Ric got the ax. To someone, apparently, his job was not essential. Too bad the person who determined this didn't understand company tradition or, apparently, what Ric actually did.

Ric acted single-handedly as the contact for a horde of reporters and magazine writers who had to find out something *now* about some aspect of the Mac. Although Apple would have preferred that one of its "PR professionals" (who didn't know a bit from a byte) be the conduit for queries, Ric was allowed to be a bypass — a sort of PR ombudsman. He was amazing at solving problems, and all of us journalists relied on him.

So here was a guy with a job he created for himself. The job took a load off the PR professionals and helped give Apple a positive image in the press as a good-guy company that got the media what it needed. This is not easy to accomplish, and most companies would kill for a utility player like Jones. All the press people who knew Ric were shocked when he was let go. The Apple loaner team claimed it wasn't their decision. If not theirs, then whose? Well, it really didn't matter, because Ric Jones' leaving cast in stone the impression that Apple was losing it. Here's the message this incident imprinted on the psyches of the journalists who covered Apple: Apple isn't even smart enough to keep someone like Ric.

Every time a company experiences a change in management, it loses the accumulation of ideas that created a program. The program has to be reevaluated, and the reevaluation is seldom as good or as thorough as the initial evaluation. When Sculley lost interest in Apple, a generation further removed from the ideals of the company's founders entered the picture. A new guy at the top means more churning over of employees, too many reevaluations of systems already in place, and the likelihood of another Ric Jones fiasco.

Building a faster, easier-to-use box full of silicon doesn't do a company much good at times like these.

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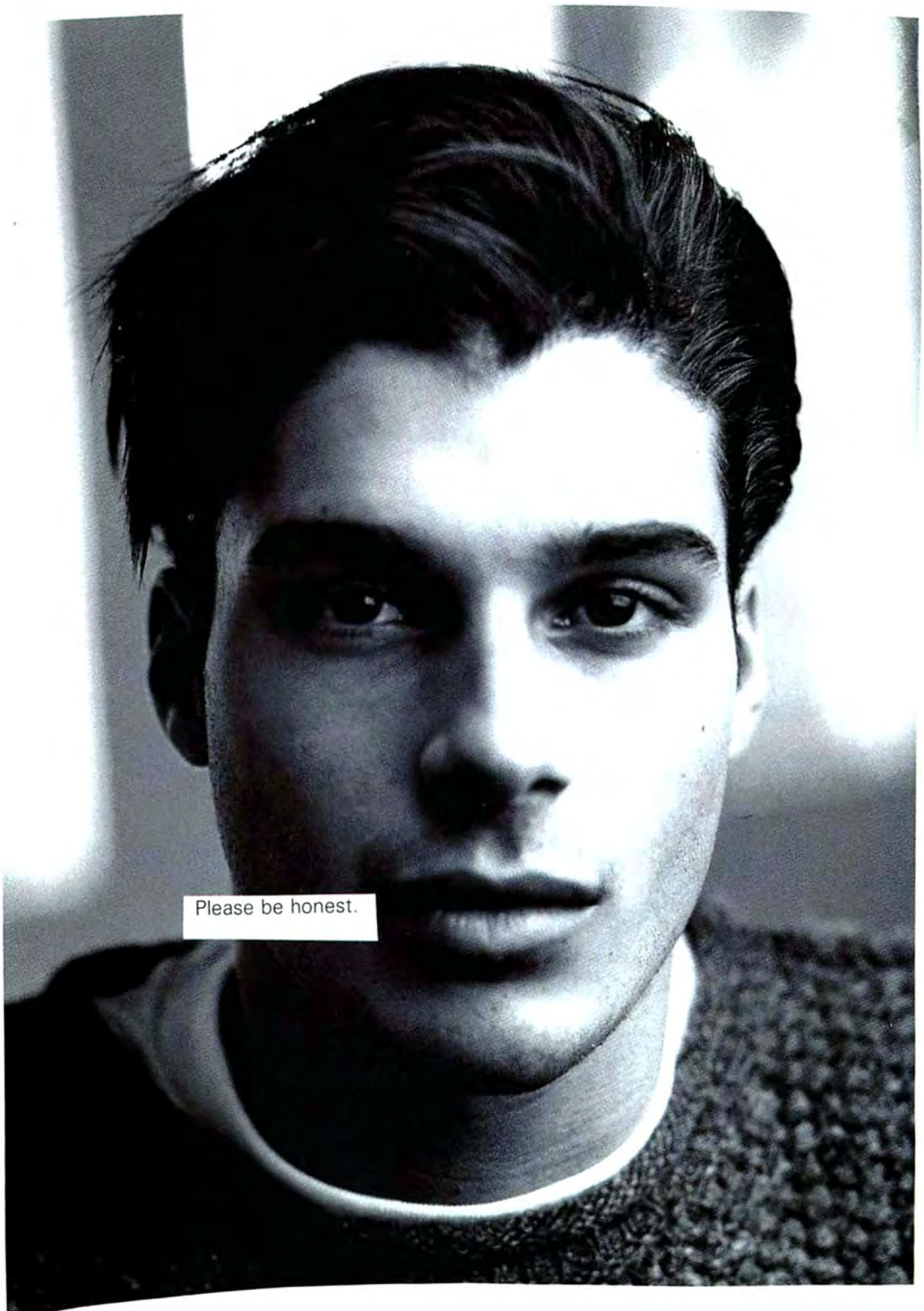
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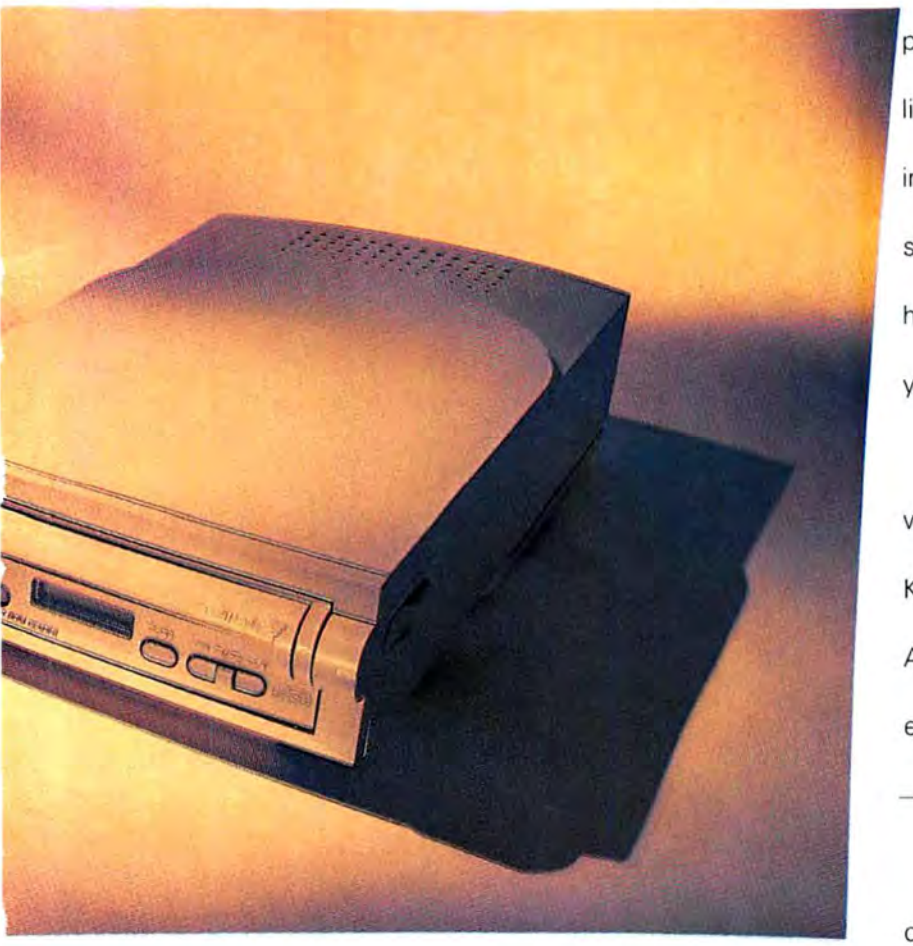

They're compatible with Macs and PCs, as well as Kodak Multisession Photo CDs. And they come with the longest commitment in the industry – a 2-year limited warranty.

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